

## Research Article

# UTILISING DIGITAL INNOVATION FOR SUSTAINABLE DEVELOPMENT – THE CASE OF MOBILE MONEY IN SIERRA LEONE

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### ABSTRACT

According to the United Nations Conference on Trade and Development (UNCTD, 2017). achieving the ambitious 2030 Agenda for Sustainable Development Goals (SDGs), (UN,) 2015 requires new innovation approaches that are socially inclusive and environmentally benign. In line with this agenda, mobile payments technology is becoming increasingly significant, especially in the context of developing economies, where many low-income households and micro-enterprises do not have ready access to financial services. Mobile money and digital wallets therefore, offer an innovative technological solution to fill the financial infrastructure gap and alleviate frictions related to the limited use of formal financial services. The objective of this study is to investigate how the utilisation of digital innovation leads to sustainable development with mobile money in Sierra Leone. This study used a quantitative and qualitative descriptive approach and targeted a population of mobile money users. Data was collected through self-administered questionnaire and interview from a sample size of about ninety-five (95) participants selected from the target population. The data collected was analysed using Statistical Package for Social Sciences (SPSS) version 25. The findings revealed that the usage of mobile money is not new in Sierra Leone as people have knowledge on the usage of mobile money; and the motivation for using mobile money is for its easy accessibility and convenience. Also revealed is that mobile money can play a key role in reducing the cost of remittances and the achievement of SDG 9; and that by enabling faster, cheaper and safer financial transactions, mobile money can help to achieve other SDGs. The study recommends that mobile service providers in the country need to continuously embark on sensitizations and promotions for the population to subscribe to mobile money for its benefits especially its convenience and improve its network infrastructure.

**Keywords:** Mobile Money, Digital Innovation, Sustainable Development Goals, Service Providers, Network Infrastructure, Financial Transactions.

### INTRODUCTION

According to the United Nations Conference on Trade and Development (UNCTD, 2017) achieving the ambitious 2030 Agenda for Sustainable Development Goals (SDGs) (United Nations, 2015) requires new innovation approaches that are socially inclusive and environmentally benign. The scale and ambition of the Sustainable Development Goals require innovation in development and innovation for development. As reported by the Organisation for Economic Cooperation and Development (OECD) (2016), the digitalization of economies and societies is progressing with the increasing adoption and use of information and communication technologies (ICTs), and the continuous migration of social and economic activities to the Internet (through digital services such as social networks, e-commerce, e-health and e government).

In developing countries where financial inclusion is very low, many individuals and households rely on informal means of saving such as saving “under a mattress”, saving in jewels or livestock, saving in groups made of friends or relatives such as merry-go-rounds where individuals come together and contribute a given amount of money in a rotatory system (Steinert *et al.*, 2018; as cited by Skogqvist, 2019). However, Mobile payments technology is becoming increasingly significant, especially in the context of developing economies, where many low-income households and micro-enterprises do not have ready access to financial services. Mobile payment facilitates financial inclusion, and offers potential for financial integration. Lashitew and Tulder (2019), emphasised that innovations of mobile money, also

called mobile banking, leverage rapidly expanding mobile phone access in developing countries to support banking and payment services. Mobile money services have rapidly expanded across emerging and developing economies and enabled new ways through which households and firms can conduct payments, save and send remittances. This study therefore, seeks to investigate the utilisation of digital innovation for sustainable development in Sierra Leone with mobile money in perspective.

Mobile money and digital wallets offer an innovative technological solution to fill the financial infrastructure gap and alleviate frictions related to the limited use of formal financial services. According to Akinyemi and Mushunje (2020) Mobile Money Technology (MMT) is used for sending or receiving payment through mobile phones. It involves financial innovation that makes use of Short Message Service (SMS) technology to remunerate providers of different services using a commission system (Upadhyay and Jahanyan, 2016; as cited by Akinyemi and Mushunje, 2020). Through MMT, financial and banking transactions such as remittances transfers, airtime purchase, utility bill, school fees payments, savings and mobile banking can be performed (IFC, 2011). MMT also makes use of unconventional banking instruments to bring financial services to unbanked subscribers in rural and remote areas. Mobile money speed up money transfer since payment is made through an electronic medium (Morawczynski, 2009).

In Sierra Leone. the telecommunication sector is growing and penetration is increasing. Mobile network coverage is good in urban and rural areas estimated about 80% (Orange Mobile Money Survey, 2021). The unreliability of mobile services due to lack of power and network outages will stay a concern for the time being. Different players are getting involved in providing financial services: The

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Banks, Micro Finance institutions (MFIs), Community Banks (CBs), Financial Services Associations (FSAs) and Money Transfer Organisations (MTOs) are seen playing precedents. The numbers of MFIs, CBs and FSAs have grown considerably since the end of the civil in 2002 and have demonstrated a commitment to serve rural areas. The banking sector seems less dynamic in reaching out to new clients or regions. Some initiatives are underway such as the establishment of a bank account switch.

Sierra Leone is a cash economy and the use of formal financial services is very low, around 10% (Orange Mobile Money Survey, 2021), although growing. There is a huge unmet demand, particularly for credits and to a lesser extent for savings. Micro Finance Institutions (MFIs), Community Banks (CBs) and Financial Service Associations (FSAs) are responding to this need and have built up an impressive market position in the last 11 years. Many informal means of savings and credits are also in use, such as borrowing from family and friends and traders or savings with an Osusu-thrift system. In addition, there is a huge untapped potential for domestic money transfers, an estimated 3.3 million (Orange Mobile Money Survey, 2021) transactions run through informal channels annually. Drivers or family and friends are mostly used. These informal ways are cheaper, but perceived as less reliable and slow. People at the bottom of the pyramid are interested in MMT. The rapid pace of change in the technology has forced the business organisations to think out of box and align their operational mechanism accordingly. The need for the sustainable digital innovation is a major need of the current decade for meeting the increasing demands of the society in a sustainable way. The current offer of MMT - from Afri-Money and Orange Money responds primarily to the need for better domestic payments.

As a result of the limited access to formal financial institutions, many individuals in developing countries use informal savings methods that are at times risky, unconventional and unreliable. Savings mechanisms such as saving "under a mattress" poses a risk of losing the money through theft or fire and one can be tempted to use the money for other purposes such as buying "temptation goods" (Skogqvist, 2019). Further studies show that financial inclusion is very low in developing countries; and that majority of the individuals that have a limited access to formal financial services are mainly in the rural settings. However, the rapid penetration, adoption, access and use of mobile money are changing the manner at which individuals use financial services. For instance, MMT providers like Afri-Money and Orange Money have started offering services of that nature across and partnership with the different banks seem emerging. Orange Money for example has Orange Lajor that allows user to get loans at an interest rate (Orange Money Lajor Project Document). This provides a secure, convenient, fast and efficient way to get loan. In Sierra Leone there is strong empirical evidence showing that access to mobile money helps households to increase savings, increase consumption, increase use of a bank account and change occupational choices (Orange Mobile Money Survey, 2021). Mobile financial services have grown significantly in Sierra Leone and Africa as a whole. The rapid growth in the mobile money industry, in particular, has led to increased access for the less privileged and the disadvantaged population to affordable financial services not only within, but also across borders. Despite the opportunities this provides, the rapidly developing technology poses a challenge to regulators to support cross-border payments in a world that is also engaged in combating the rise in money laundering, terrorist financing, fraud and other financial crimes.

While there is growing evidence showing that mobile money use increases savings, it remains unclear how utilising digital innovation through mobile money affects the savings behaviours of individuals that will eventually lead to sustainable development in Sierra Leone.

In spite of the transformative potential, the relation between digital innovation and resulting socioeconomic transformation through mobile money has been underexplored, especially at the societal level in developing countries and Sierra Leone in particular. This study therefore, seeks to explore how the utilisation of digital innovation through mobile money makes for sustainable development.

## MATERIALS AND METHODOLOGY

For a broader understanding of the topic, this section will synthesise digital innovation as a concept and identify gaps in the mobile money transaction for sustainable development.

**The Concept of Digital Innovation** - Nan (2019) noted that digital innovation is an emerging concept therefore lacks conceptual clarity. Only a few studies explicitly define the term, digital innovation. Digital innovation is defined as the carrying out of new combinations of digital and physical components to produce novel products (Yoo *et al.*, 2010; cited by Nan, 2019). Secondly Digital innovation is defined as an innovation enabled by digital technologies that leads to the creation of new forms of digitalization. Digitalization refers to transformation of socio-technical structures that were previously mediated by non-digital artifacts or relationships into ones that are mediated by digitized artifacts and relationships according Yoo *et al.*, cited by (Nan, 2019). Also, Fichman *et al.*, (2014) defined digital innovation as a product, process, or business model that is perceived as new, requires some significant changes on the part of adopters, and is embodied or enabled by information technology.

According to Nan the definitions of digital innovation have little in common and are limited in two aspects. First, it is not clear whether digital innovation refers to process or outcome. Whereas the first definition focuses on the process of creating novel products, which is carrying out of new combinations, the rest definitions give prominence to the outcome of digital innovation as creation of new forms of digitalization such as product, process or business model.

Second, Nan furthered that digital innovation as defined by Yoo *et al.*, is confounded with socio-technical transformation and runs the risk of being tautological. Anecdotal evidence, however, shows that not all digital innovations necessarily lead to transformation. For example, while Mobile Money (MM) has taken off in such countries as Kenya, Uganda, and Zimbabwe, the similar digital innovation in countries like Haiti, India and South Africa has failed to take off (Evans and Pirchio, 2015; cited by Nan 2019). Thus, a conceptual as well as analytical distinction between digital innovation and transformation needs to be made in order to explore processes or mechanisms standing between a digital innovation and subsequent transformation.

Building on previous research about defining digital innovation, Nan defined digital innovation as an innovation process involving digital technologies and the innovation outcome of that process, such as the creation of a new product, process, or business model. This working definition connotes both process and outcome of digital innovation. As for process, it is characterized by ever-increasing capabilities of digital technologies, embedding digital capabilities into physical components and reconfiguring digital and physical components. The mobile money (MM) story illustrates this point well. As an outcome of digital innovation, MM can be a product, process or business model, characterized by combination of physical and digital components. For example, smart phone, 3D printing, and MM are instances of digital innovation as a product, process and business model, respectively. Despite the conceptual distinction between process and outcome, a

clear line can hardly be drawn. This is mainly because of the flexibility of digital technologies.

**Harnessing the Digital Revolution** - According to Development Policy Forum (DPF, 2017) report digital technologies are creating economic opportunities. Suppliers and buyers in the global economy can now interact directly regardless of their size or location. For example, Chinese companies selling on Alibaba typically reach around 100 export destinations, more than twice the average of their offline competitors. The value of businesses trading on global e-commerce sites such as Alibaba could top \$6 trillion over the next five years (DPF, 2017). DPF report noted that while the population's access to bank accounts and services in many developing countries remains very low, a significant expansion of mobile money services could provide every citizen with a digital bank account. In Somalia, for instance, while only 15% of the adult population uses banking services such as Hawala, around 72% use mobile money (DPF, 2017). Where mobile money or online banking has been used, it has shown to promote self-employment opportunities. Ensuring universal access to digital financial services is thus a definite option for countries to leapfrog into the digital economy. Additionally, to boosting trade, technology improves governance, anti-corruption measures and transparency. Governments in developing countries are using data and technology for fiscal management, enhanced accountability, people management, procurement and the delivery of public services. For example, the World Bank has worked with Moldova to provide easy, around-the-clock access to government documents and around 80 public services, resulting in greater transparency and efficiency according to DPF report. The report further pointed out that yet the real significance of digital development for the SDGs is likely to lie in helping to achieve many of the targets. The World Bank's 2016 World Development Report on Digital Dividends identified three broad ways in which ICTs, and especially the internet, facilitate and could indeed be transformational for broader development: First, by promoting the inclusion of disadvantaged groups within society such as by facilitating the provision of a digital identity to all or by allowing disabled persons to work from home; second, by boosting efficiency, such as through reducing transaction costs using e-commerce; third, by using ICT to promote innovation, such as the development of mobile money and ride-sharing platforms. The delivery of these "digital dividends" is dependent on complementary skills, leadership, institutions and policies/regulations – highlighting that the digital phenomenon is cross-cutting and could impact most aspects of the economy and society. DPF reported further noted that it is clear, however, that the digital revolution has not touched everyone. The lack of reliable and affordable connectivity infrastructure remains a critical challenge. Broadband internet is still in its infancy in sub-Saharan Africa, where internet users represented only 22% of the population in 2016, compared to 44% worldwide. Globally, four billion people do not have access to broadband. The longer those countries and their citizens remain excluded from the online world, the greater their missed development opportunities (DPF, 2017). The digital revolution furthermore, presents societies with a whole new set of challenges ranging from the disruptive effects of technologies such as automated jobs and employability, to digital exclusion and inequality, cyber security, data privacy and regulatory issues.

**Fostering Inclusive Innovation for Sustainable Development** - Kaplinsky (2018) argued that the gains from sustained economic growth have been unevenly spread, and many countries are confronted by substantial and growing levels of social and economic exclusion, accompanied by a degrading environment. The outcomes of existing growth pathways need to be holistically understood in terms of their economic, social and environmental character.

Individual indicators such as employment and the share of manufacturing in gross domestic product (GDP) provide only a partial glimpse of the challenges to be overcome to promote more inclusive growth pathways Kaplinsky explained. More inclusive patterns of innovation offer the prospect of facilitating the move to more sustainable and equitable growth pathways. Inclusive innovation according Kaplinsky has three major characteristics: It can involve the production of products appropriate to the needs and incomes of the marginalised; provide for a greater degree of involvement of marginalised people and communities in processes of production; and involve the participation of the marginalised in the process of innovation itself. Innovations can be new to the enterprise, the country, the sector or the world. From the perspective of the rate and trajectory of growth and development, the degree of absolute novelty is not the most important concern the contribution of technological progress is that it provides an advance on what has occurred in the past, and that this advance is realistically within the competence-horizon of the innovating stakeholder Kaplinsky emphasised. The world is currently witnessing the diffusion of a series of disruptive technologies according to Kaplinsky. In his literature Kaplinsky argued that these disruptive technologies are embedded in a wider historical evolution of socio-techno economic paradigms. The existing dominant paradigm is a global extension of the principles of mass production, in which production and consumption are geographically separated, scale economies are pervasive, capital investments are scale- and skill-intensive, and negative environmental externalities are widespread. Systemic exclusion across a number of dimensions is intrinsic to this growth paradigm. The central argument of Kaplinsky's literature is that the dominant paradigm, characterised by systemic exclusion, is in crisis. However, we are witnessing the possible emergence of a new paradigm – one that offers the potential for more sustainable and inclusive growth pathways. This involves the widespread diffusion of smaller-scale, less capital-intensive and more environmentally benign technologies that facilitate distributed and inclusive patterns of production, and produce products more appropriate to the needs of the global poor, who represent an increasingly large consumer market.

Six case studies of the lived experience of inclusive innovation in low- and middle-income economies provide evidence of the opportunities opened by innovation to facilitate the transition to a more inclusive growth and development pathway. These are with respect to: hydroelectric and other sources of renewable power; promoting the dynamism of small and medium-sized enterprises (SMEs) and clusters of informalised enterprises; the diffusion of mobile money platforms and related ICT services; innovations in public healthcare; innovations by transnational corporations for Bottom of the Pyramid (BOP) markets; and the role played by social movements in urban habitats. The case studies illustrate the potential for a more inclusive innovation and growth pathway and, in some cases; the diffusion of these innovations is being driven rapidly forward by market forces. However, potential does not always translate into reality; moreover, inclusive innovations, however profitable, do not always diffuse at optimal rates. Therefore, there is scope for a range for policy interventions. Some of these affect macro-economic policies; others (such as the promotion of South-South trade in appropriate technologies) will benefit from discrete policy interventions.

**The Mobile Industry and the Sustainable Development Goals** - According to Lopez (2019) in 2016, mobile became the first industry to commit to the SDGs. The mobile industry connects more than five billion individuals around the globe, providing access to essential communications and life-enhancing services. This unrivalled reach and impact of mobile is transforming business models across industries and societies. Lopez pointed out that the GSMA has

developed a methodology to measure the contribution of the mobile industry across all 17 SDGs. Mobile Money has been central to the industry's contribution to many of the SDGs. The Global Goals provide a unified and integrated framework to understand how mobile money is contributing to sustainable development according to Lopez.

**Harnessing the Power of Mobile Money to Achieve the Sustainable Development Goals** - As stated, Lopez (2019) over the last decade, mobile money has been disrupting traditional financial services and transforming the lives of hundreds of millions of people across developing countries. Today, with over \$1.3 billion a day processed by over 866 million registered accounts in 90 countries (Global System for Mobile Communications Association (GSMA), 2019), mobile money has evolved into a broader payments platform that provides access to life-enhancing services, such as healthcare, education, employment, transportation and social protection. At a macro level, mobile money fuels economic growth by facilitating savings and investments, creates employment, drives business productivity and entrepreneurship, helps formalise the economy and provides stability during economic downturns. Mobile money is a key driver of socio-economic growth and is becoming a gateway to the digital economy. As national economies become increasingly dependent on digital technology, the power of mobile money to harness digital finance for sustainable development is strengthening Lopez emphasised.

**Mobile Money: A Digital Innovation in Sub-Saharan Africa** - Mobile Money (MM) is considered a digital innovation because the disruptive financial services are made possible by digitalizing cash into electronic money (e-money) and by digitally reconfiguring a variety of physical sociotechnical components that were previously disconnected (Tilson *et al.*, 2010; Yoo *et al.*, 2012; as cited by Nan, 2019). MM providers orchestrate telecommunication infrastructure, a network of transactional agents, mobile phones, and cash to establish an end-to-end digital financial services ecosystem. By visiting an authorized "brick-and-mortar" transactional agent (e.g., convenience store), prospective users can create MM accounts and start cash-in process converting cash into e-money stored in MM accounts. With e-value stored on their mobile phones, users are able to conduct a range of financial transactions, i.e. person-to person money transfer, bill payment, airtime top-up, regardless of time and space.

Nan emphasised that the defining nature that distinguishes MM from other mobile-based financial services (e.g., mobile banking in developed countries) is twofold: 1) users can sign up for the services even without bank accounts (as opposed to the case that use of mobile banking often requires a pre-existing bank account); and 2) transactional agents, often existing small businesses, are contracted with MM service providers to offer registration, cash-in and cash-out services to users. The agents, outside the sphere of traditional financial institutions, are scattered across a country providing ubiquitous touch points for users, especially those excluded from traditional banking services. This makes MM a promising digital financial services tool to broaden reach and coverage of basic financial services into population, especially those who would otherwise be excluded from traditional banking services (GSMA, 2015; Evans and Pirchio, 2015; Aron, 2018). Since its inception, MM has been widely adopted in emerging economies, especially Sub-Saharan Africa.

**Understanding the Greater Diffusion of Mobile Money Innovations in Africa** - According to Asongu *et al.*, (2020) their research is extension to the research of Lashitew, van Tulder and Liasse (2019) in order to comparatively clarify why Africa is in the driver's seat when it comes to mobile phone innovations for financial

inclusion. The premise of Asongu *et al.*'s argument is fundamentally motivated by the fact that while a substantial part of the empirical results section of the underlying research is devoted to explaining why Africa is in the driver's seat, the empirical analysis on which the leading role of Africa is drawn is a significant African dummy estimated coefficient. However, it is relevant to understand factors underlying the higher significant magnitude of the African dummy in order to provide both scholars and policy makers with the attendant variables that are driving mobile money innovations in Africa Asongu *et al.*, asserted.

Asongu *et al.*, two motivational elements are worth taking on board in order to further articulate the relevance of their literature, notably: (i) the role of financial inclusion and mobile money innovations in the light of challenges pertaining to sustainable development goals; and (ii) the importance of replicating research in social sciences. The underlying elements are elicited in turn.

First, it is important to note that sustainable development challenges, especially those surrounding poverty alleviation are more apparent in Africa, compared to other developing countries in the world. This is also the reason for a more robust comparative analysis of the underlying literature in order to better grasp African-centric factors that are relevant in financial inclusion by means of mobile money innovations. To put this point into more perspective: (i) compared to other developing countries, most African countries failed to reach the millennium development goal (MDG) related to extreme poverty alleviation. Moreover, current projections articulate that the goal of reducing extreme poverty to an acceptable threshold of 3% by 2030 is unfeasible unless inclusive policies are comprehensively implemented (Bicaba, Brixiova and Ncube, 2017). (ii) There is a substantial bulk of literature on the rewards of mobile phone innovations in improving inclusive economic and human developments in Africa. Inclusive development can be understood in terms of absolute pro-poor inclusion (i.e. reduction of poverty) and/or relative pro-poor inclusion (i.e. reduction of inequality) (Asongu and Nwachukwu, 2017).

**Mobile Phones for Financial Inclusion: What Explains the Diffusion of Mobile Money Innovations?** - As Lashitew *et al.* (2019) noted innovations of mobile money, also called mobile banking, leverage rapidly expanding mobile phone access in developing countries to support banking and payment services (Demirgüç-Kunt and Klapper, 2012; Jack and Suri, 2011). In Sub-Saharan Africa mobile phone penetration has reached 76%, whereas the percentage of people with bank accounts remains less than 30% (Demirgüç-Kunt and Klapper, 2012; cited by Lashitew *et al.* (2019). This has created a room for mobile money services that provide accessible and affordable financial and payment services to previously unbanked, low-income segments of society (Munyegera and Matsumoto, 2016). As of 2016, the number of people with mobile accounts has grown to half a billion globally, out of which 277 million were found in Sub-Saharan Africa (GSMA, 2016) Lashitew *et al.* explained.

According to Lashitew *et al.*, the East African region is at the forefront of the mobile money revolution, Kenya being a frontrunner with more than 70% of the country's adult population using mobile money services (GSMA, 2015). M-Pesa, the country's leading mobile money service, is one of the first and most successful mobile money services in the world and is credited for inspiring similar innovations globally (CGAP, 2014; Aker and Mbiti, 2010; as cited by Lashitew *et al.*, 2019). Mobile money has become an integral part of Kenya's economy, and is extensively used for diverse purposes such as domestic and international money transfers, paying school fees and utility bills, and point-of-sale transactions at thousands of stores and service centers. The value of money transferred through M-Pesa had

reached more than 30% of the country's GDP as of 2011 (Vaughan *et al.*, 2013), which grew to 85% of GDP in 2016 (Safaricom, 2016). M-Pesa provides significant welfare advantages, according to some estimates helping lift at least 2% of the country's population out of extreme poverty (Suri and Jack, 2016) Lashitew *et al* asserted.

Similarly, Lashitew *et al* furthered that the significant adoption of locally developed mobile money services in Africa is puzzling, since traditionally technologies are developed in advanced countries, before gradually spilling over to less developed countries (Aron, 2017; Van der Boor *et al.*, 2014; as cited by Lashitew *et al.*, 2019). Mobile money highlights the potential advantage of Information and Communication Technologies (ICTs) to enable developing countries to 'leapfrog' to more efficient and modern economic systems (Aron, 2017; as cited in Lashitew *et al*, 2019). Mobile money provides significant efficiency improvements compared to traditional means of money transfer since it reduces travelling time, and enhances safety and convenience (Munyegera and Matsumoto, 2016; Jack and Suri, 2014). It can also foster the formalisation and modernisation of the large informal economy that characterizes most developing countries. The service, therefore, appears to be an example of 'appropriate technologies' that address the specific needs of developing economies. Mobile money innovations like M-Pesa can also be viewed as 'inclusive innovations' given their capacity to foster financial inclusion by reaching previously 'unbanked' populations Lashitew *et al* emphasised.

Lashitew *et al* posited that mobile money innovations are expanding rapidly, riding on the back of ever-increasing access to mobile phones. In 2006, there were just 10 mobile money services globally (Aker and Mbiti, 2010; as cited in Lashitew *et al.*, 2019), while in 2014 the innovation came to be adopted in 89 countries, including 81% of Sub-Saharan African countries (GSMA, 2014). The literature of Lashitew *et al* additionally pointed out that by 2016, the number of people with mobile money accounts around the world had grown to half a billion, out of which 277 million were in Sub-Saharan Africa (GSMA, 2016) as cited by Lashitew *et al.*, (2019). These services support diverse functions including peer-to-peer money transfers, bill payments, utility and school fee payment, and buying airtime credit (Demirgüç-Kunt and Klapper, 2012). Although mobile money systems exhibit some differences across service providers, their functioning shares many similarities (Murendo *et al.*, 2017). Typically, a user registers at an agent of the service provider, and deposits cash that will be used for later transactions. When a customer deposits cash at the agent, an equivalent amount of electronic money is transferred to his/her mobile wallet. The customer can then use his/her electronic money to make transactions such as sending money and paying bills (Demirgüç-Kunt and Klapper, 2013). When a user transfers money to another mobile phone, the receiver gets an instant notification with a unique code through Short Message Service (SMS). The recipient can visit the closest agent to collect the cash, or alternatively leave the money as a deposit in his/her mobile wallet for future transactions

**Digital Innovation and Socioeconomic Transformation: Mobile Money in Sub-Saharan Africa** - Digital innovation enabled by digital technologies has the potential to transform existing socioeconomic practices, processes, and structures. In spite of the transformative potential, the relation between digital innovation and resulting socioeconomic transformation has been underexplored, especially at the societal level in developing countries (Nan, 2019). Drawing on the digital innovation and technological transition literatures, Nan proposed a multilevel theoretical framework that illustrates the processes and mechanisms through which digital innovation enables socioeconomic transformation in developing countries context.

In his literature Nan noted that Mobile Money provides basic financial services to both banked and unbanked population at a convenient, secure, and affordable way via mobile phones. As such, the disruptive mobile-based financial services have been argued to address financial services gap in developing countries and in particular hold the potential to play transformative roles in Sub-Saharan Africa where traditional banking infrastructure remained underdeveloped. Mobile Money according to Nan has been transforming the way people conduct financial transactions (i.e. money transfer and storage) and that MM, when widely adopted in a society, can serve as a digital pathway for developing countries to leapfrog the traditional financial services gap and achieve socioeconomic development.

**Mobile Money as a Frugal Innovation for the Bottom of the Pyramid – Cases of Selected African Countries** - David-West *et al* (2019) commented that resource constraints present in Africa and other emerging markets have made the continent appropriate for frugal innovations, especially using Information and Communications Technologies (ICTs) to address socio-economic issues such as access to formal financial services. In Africa, high mobile penetration rates remain essential in bridging the digital divide and facilitating consumer access to services available through Information Technology for Development initiatives. In the financial services industry, mobile telephony has created a leapfrog effect on the development of mobile and other digital financial services that have improved financial inclusion. While this phenomenon has had a transformational impact in African countries like Kenya and Tanzania, others like Nigeria struggle to enhance financial inclusion even with the availability of mobile financial services. This is a major concern as financial inclusion or affordable and ubiquitous access to formal financial services is a viable tool in enhancing economies and the livelihoods of the individuals in the economies David-West *et al* emphasised.

Mobile money is a frugal innovation (Lehner and Gausemeier, 2016; Peša, 2018; cited by David-West *et al.*, 2019) that addresses financial exclusion. Adults, especially those residents in rural locations, lack access to financial services and also lack the needed infrastructure to connect to formal financial service systems. According to David-West *et al* evidence suggests that mobile money accounts exceed bank accounts in East African countries like Uganda, Kenya and Tanzania; and over 40 percent of the adult populations own mobile money accounts (David-West *et al*, 2019). David-West *et al* noted that according to Global Systems for Mobile Money Association (GSMA, 2017) reported that the number of mobile money customers grew to 338 million in 2017 from 75 million in 2012. A report on West Africa's dominance of the global international remittances shows that the average mobile money international remittance cost in West Africa is cheaper than that of traditional money transfer operators by an average of about 60 percent. Economic migrants are increasingly using mobile money in Ivory Coast, Burkina Faso, Mali and Senegal (which share a common language and currency) to send money across borders. In Senegal for instance, Kim (2017; cited by David-West *et al*, 2019) noted that as at 2017, mobile network operators own over 81 percent of financial access points, thus contributing 37 percent growth in mobile money access points in 2016.

David-West *et al* pointed out that Mobile financial services are proving to be an essential tool for creating and delivering value to the bottom of the pyramid segment (BoP). This is clear in its contribution to 13 of the 17 sustainable development goals (SDGs) through enabling access to essential services like health and education, women empowerment with employment opportunities, and poverty reduction through offering life-enhancing financial services, often for the first time. The characteristics of the bottom of the pyramid customer

segment include low income, low educational (literacy) status and, partial or total disconnection from the formal economy because of the absence of critical development infrastructure that would have eased their inclusive participation in the formal economy. Mobile money has also provided a lifeline to distressed individuals and households through digital humanitarian cash transfers and affordable international remittances (GSMA, 2017). These opportunities have given displaced individuals, such as refugees safe and convenient ways to meet their everyday needs. Mobile money services have also facilitated access to credit and enhancement of supply chains to micro-entrepreneurs such as smallholder farmers, while also closing the gender gap in access to financial services, especially in the places where culture and religion prohibit women from being able to come out and access basic financial services or make simple business transactions according to David-West et al.

David-West et al conceptualized mobile money as a frugal innovation along three dimensions – a technology innovation amidst vast resource constraints that targets bottom of the pyramid (BoP) markets and consumers; an innovation that addresses the constraints of affordability of financial services; and as a technology innovation that addresses institutional voids. As a frugal innovation, mobile money initiatives have resulted in the evolution of new business models that supposedly address the business constraints of value creation and value capture. Howell, van Beers, and Doorn (2018) posited that the low-cost and value-sensitive design innovations facilitated by ICTs qualify such innovations as frugal. Considering this, Rao (2013) posited that although nascent, frugal products and services such as mobile money will improve with successive generations and, address present concerns of design and spares David-West *et al* asserted. David-West *et al* literature on frugal innovation and BoP business models, explored mobile money services as frugal innovations and their ability to bridge the tension between value capture and value creation in sub-Saharan African markets.

**Determinants of Mobile Money Technology Adoption in Rural Areas of Africa** - Akinyemi and Mushunje (2020) in their research stated that Mobile money technology (MMT) is used for sending or receiving payment through mobile phones. It involves financial innovation that makes use of Short Message Service (SMS) technology to remunerate providers of different services using a commission system (Upadhyay and Jahanyan, 2016). Through MMT, financial and banking transactions such as remittances transfers, airtime purchase, utility bill, school fees payments, savings and mobile banking can be performed Akinyemi and Mushunje emphasised. MMT also makes use of unconventional banking instruments to bring financial services to unbanked subscribers in rural and remote areas. Mobile money speed up money transfer since payment is made through an electronic medium. The proliferation of MMT has brought about access to markets, prices and weather data, as well as facilitating access to financial services for the unbanked population (Trendov *et al.*, 2019) as cited by (Akinyemi and Mushunje 2020).

Mobile money services facilitate distant payments. They are often designed specifically to facilitate payment transfer between distant individuals. In developing countries, domestic transfers are mainly from urban to rural areas. In African countries, particularly in rural areas, there is evidence that suggests that mobile money has improved rural household incomes through remittances from urban areas (Kikulwe *et al.*, 2014). More so, the fact that the use of mobile money funds is protected by Personal Identification Numbers (PIN codes) makes it a secure means of savings for rural populations who have limited access to formal financial institutions and face risks caused by traditional means of money transfer and savings (Jack and Suri, 2011; Kikulwe *et al.*, 2014; as cited by Akinyemi and Mushunje

2020). According Akinyemi and Mushunje adoption of mobile money technology in peripheral regions of Africa where conventional banking services are entirely lacking is very important for financial inclusion. Although the population of mobile money users has recently increased, its adoption in rural areas remains low. Akinyemi and Mushunje literature concluded that mobile money is easier, safer, more trustworthy, more convenient, and faster, respectively; and also show that age, years of education, unemployment, and ownership of bank accounts explain both the adoption and the amount of money sent using mobile money technology.

**Communication Technology, Capabilities and Livelihoods: The Role of Mobile Money in Facilitating Financial Inclusion and Development in Rural Kenya** - Tuwei (2018) posited that in urban and rural Kenya, the use of the mobile telephone for banking has become a part of everyday life. People use mobile money to accomplish a variety of functions such as transfer money, save, and pay bills, among other uses. At the national level, the government considers mobile money important for individual and national development. Tuwei literature focused on Safaricom's M-Pesa, the most popular mobile money application in Kenya. Industry experts and development analysts have praised M-Pesa for enabling access and inclusion into the formal financial economy of people in the rural areas. Tuwei's research examines, first, the role of mobile money in the everyday lives of people in rural Kenya, and second, the role of M-Pesa agents, intermediaries between the operator and users, that facilitate these services. In his investigation Tuwei found that M-Pesa users and M-Pesa agents utilized M-Pesa for their individual development. Notably, the M-Pesa agency business model, kiosks where M-Pesa transactions took place, had provided entrepreneurial opportunities for business operators in the informal economy. Equally important, the application was fundamental for facilitating local-local and global-local financial flows. The ease of making financial remittances through M-Pesa had saved people the cost of transport to the banking halls in town, and made it easy for participants to forward their transaction or self-help group contributions Tuwei asserted.

However, despite the speed and convenience of transactions brought by M-Pesa, there were widespread perceptions that financial management had been made difficult by the fact that money was now so fluid on M-Pesa, a contrast to how it was in the cash only economy. Financial flows had also negatively impacted social relations according to Tuwei. At the same time, Safaricom's introduction of M-Shwari, the digital saving platform, had provided alternative avenues for saving and borrowing money outside of friends and family. Although M-Shwari fostered the privacy of financial transactions, among other perceived advantages, the application was displacing long-held collectivist financial arrangements by introducing individualistic financial practices Tuwei emphasised. In all of these Tuwei asserted that companies look to agents to explain to clients about the existence of the new services. For customers who do not know how to execute any operation of mobile money such as sending, depositing or withdrawing money, agents take them through the process

**Digital Strategies Senior Bank Executives in Mauritius use to Improve Customer Service** - Sewpaul (2018) argued that in Mauritius customers' use of digital banking has reshaped traditional banking, and senior level bank executives must know how to leverage this innovation to improve customer service to increase profitability. Using the technology acceptance model as the conceptual framework, the purpose of Mauritius as case study was to explore effective digital banking strategies that senior level executives used to improve customer service to increase profitability. In Sewpaul's

literature three themes emerged from the analysis of data: use of mobile strategies to migrate customers to digital banking, challenges to migrate customers to digital banking, and digital banking innovation. The implications of Sewpaul investigation for positive social change include improving convenience to customers; promoting green banking; and providing easy access to banking to the poor, those with physical disabilities, and those living in remote and rural areas.

#### **Sierra Leone Mobile Money Transfer (MMT) Market Study -**

According to Product Human and Business (PHB) Development (2013) Sierra Leone is a cash economy, more than any other country in Sub Saharan Africa. The use of formal financial services is very low, around 10% (607k bank accounts), although growing. There is a huge unmet demand, particularly for credits and to a lesser extent for savings. Micro Finance Institutions (MFIs), Commercial Banks (CBs) and Financial Services Associations (FSAs) are responding to this need and have built up an impressive market position in 10 years (90k active borrowers at MFIs). Many informal means of savings and credits are also in use, such as borrowing from family and friends and traders or savings with a ususu-person. There is a huge untapped potential for domestic money transfers: an estimated 3.3 million transactions run through informal channels annually (PHB Development, 2013). Drivers or family and friends are mostly used. These informal ways are cheaper, but perceived as less reliable and slow. The current offer of MMT - from Splash and Airtel Money - responds primarily to the need for better domestic payments. Most popular MMT services are P2P, bill payments, top-ups and corporate payments. Since 2010 the MMT providers acquired 300,000 subscribers; early adopters can be found in more urban and educated populations (PHB Development, 2013). However, also lower end people (urban and rural) seem interested, especially in the peer to peer (P2P) payments, offered by agents ('over-the-counter') and airtime top up.

In Sierra Leone, the most important benefits that MMT offers to clients are a better control over payments (no cheating, reliable delivery) and more convenience (no need to queue at the bank). Additionally, speed and invisibility (no-one sees that you are carrying money on your phone) are appreciated. The convenience benefit will strengthen once the agent network is better developed. Necessary conditions to make MMT a success include: a denser and more liquid agent network especially in the more remote areas and ample resources for customer and agent education PHB Development report suggested.

#### **New Innovation Approaches to Support the Implementation of the Sustainable Development Goals -**

The (UNCTAD, 2017) report stated that achieving the ambitious 2030 Agenda for Sustainable Development (United Nations, 2015) requires new innovation approaches that are socially inclusive and environmentally benign. The report presents several new and emerging innovation approaches, highlights how they may contribute to the achievement of the Sustainable Development Goals and discusses some of the policy implications in harnessing such approaches. It provides an overview of particular issues and considerations that need to be taken into account in coming years to maximize the contribution.

#### **Financial Inclusion and Integration through Mobile Payments and Transfer -**

Africa Development Bank Group report in 2012 emphasised the need for financial inclusion and integration through mobile payments and transfer. The report stated that the prospect of cross-border mobile payments holds much promise in promoting financial integration, adding to its benefits for financial inclusion at the national level. However, there are also challenges that must be addressed. Based on the developments in India and Africa, the report

explored the key evolving themes in the cross-border mobile payments arena, and seeks to highlight promising practices and examine critical challenges. The objective is to draw lessons from across the various countries and regions to inform policy and regulatory reforms, especially in Africa. In particular, the report discusses what the experiences in India and Africa have been regarding the benefits and challenges of mobile payments for financial inclusion and cross-border payments or regional financial integration, and addresses a range of questions. What models have been adopted across the countries to promote the mobile payments systems? What are the underlying issues that account for the successes of these models in the various countries and ecosystems? When should national authorities and/or industry operators consolidate activities or introduce innovations to meet challenges and enhance progress?

In order to enhance growth and contribution of mobile payments to financial inclusion and integration, Indian and African governments have adopted either bank-led models or non-bank-led ones in line with national economic and financial sector development (ADBG, 2013). Adoption of particular models is not a sufficient condition for the success of mobile payment programmes. The existence of adequate critical success factors in the ecosystem is also important. Critical success factors include risk-based regulation for a cheaper and profitable but secured solution to financial exclusion, policy-led interoperability for an increasing scale of economies, development-oriented support for outreach through agents, and win-win partnership for all the stakeholders. Wherever there are adequate critical success factors, mobile payment programmes are successful, as the case of MPESA in a few East African countries. Regional Real Time Gross Settlement (RTGS) systems with a mobile switch would have helped further and enabled landlocked small economies in the tripartite arrangement to benefit further from low-cost mobile money services across borders (ADBG, 2013).

#### **Technological Innovation in Mobile Payment Solutions -**

According to Kavak and Anwar (2019) the advent of mobile payment solution has brought a mixed reaction on the mind of potential consumers on whether to adopt or not. Also, the mobile payment has elicited discussion about its future. The major question is on whether the technology will replace traditional banking processes, or if it will act as a compliment Kavak and Anwar commented. In their literature Kavak and Anwar seek to promote the adoption of mobile payment by improving available information form stakeholders. The advent of mobile payment technology shows that it has a high number of benefits, but it does not match with the current adoption rate according to Kavak and Anwar. Kavak and Anwar emphasised that the majority of users of mobile payment uses it for smaller transactions such as the purchase of books and food. The slow uptake of mobile payment adoption vis a vis immense benefit of the platform. The disparity motivated the literature of Kavak and Anwar on factors that influence solution adoptions. Kavak and Anwar's research provided a clear linkage of factors such as environmental risk, reputation, trust, perceived usefulness, ease of use and mobility in influencing potential consumer attitude and intention to use a specific payment solution.

#### **The Impact of Mobile Money on the Sustainable Development Goals -**

Mobile Money has created impact on achieving the Sustainable Development in the following areas:

**Helping Households Lift Themselves out of Poverty -** As Lopez (2019) noted Mobile Money providers have facilitated access to mobile money for previously unbanked and under banked people. Globally, half of unbanked adults come from the poorest 40 percent of

households within their economy, making it nearly impossible for them to accumulate savings or establish a financial history to access other financial services. Mobile money can provide economically disadvantaged groups with the financial services they need to break out of a perpetual cycle of poverty, increase household consumption and improve the welfare of their families Lopez asserted. In Kenya, access to mobile money has been found to increase the per capita consumption levels of 194,000 households (Lopez, 2019). In rural Uganda, evidence shows that mobile money can improve the welfare of rural households by smoothing consumption and curbing poverty. Mobile money services can also enhance the welfare of smallholder farm households, which constitute the majority of the rural poor. According to Lopez a study in Uganda found that opportunities to make payments and save via mobile money significantly benefit small businesses in the handicrafts, trade and transport sectors, which were the largest sources of off-farm income for rural households in the sample.

**Building Resilient Households** - Additionally, Lopez furthered that Mobile money increases the ability of households to save and withstand unexpected life events that affect income or assets, such as job loss, health problems or environmental and economic shocks. In Burkina Faso according to Lopez mobile money users were found to be three times more likely than non-users to save for unpredictable events and emergencies. Mobile money also helps individuals receive money from relatives and friends during times of crisis, reducing the likelihood of falling into poverty. By sharing and spreading out financial risk with smaller and more frequent transfers, mobile money gives users more flexibility to manage financial shocks. Cost savings from mobile money-enabled remittances can also substantially increase the income of recipient families compared to other formal channels, which also helps them become more resilient Lopez asserted.

**Ensuring Government Transfers Reach Those Who Need Them Most** - According to Lopez (2019) over 100 million adults globally still receive government transfers, wages or pensions in cash. Delivering safety net programmes through mobile money can save recipients both time and expenses. In Niger, delivering a cash transfer programme via mobile money increased household diet diversity between nine and 16 per cent and resulted in children eating an additional third of a meal per day. Spending less time travelling and waiting for their transfer also saved recipients over 20 hours, which is especially valuable during the planting season (Lopez, 2019).

**Increasing Household Food Security** - Access to mobile money services can help increase food security for the undernourished, particularly in poor, rural and remote communities. Mobile money contributes to enhance household food security through the increased liquidity that comes with cheap and easily available financial services. A study in Uganda according Lopez found that the use of mobile money increased food expenditures per adult by nine percentage points and reduced perceived food insecurity.

**Improving the Efficiency of Agricultural Value Chains** - As noted by Lopez (2019) the digitisation of agricultural value chain payments for crop procurement can reduce the dependency of smallholder farmers on middlemen and improve the efficiency of the distribution system by reducing the time it takes for farmers to receive payments. Digital payments can also reduce the risk of handling cash for both farmers and other stakeholders involved in the payment process (i.e. field clerks). In Uganda, coffee farmers who used mobile money were found to receive five per cent higher prices for their coffee on average than non-users because they could reach buyers in high-value markets rather than selling to local traders immediately after harvest.

Mobile money services can also give agribusinesses greater control over their transactions with smallholder suppliers. In Tanzania, the agricultural exporter - multi-flower found that switching to bulk digital payments from individual cash payments saved 300 farmers estimated money about \$8,000 and 6,000 hours (Lopez, 2019). Creating efficiencies in agricultural value chains through mobile money can have a significant impact on developing country economies such as Ghana, where over 45 per cent of the population is employed in agriculture and the sector accounts for about 19.6 per cent of GDP (Lopez, 2019).

**Socio-economic Impacts of Mobile Money** - Nan (2019) argued that Digital innovations have the potential to transform existing sociotechnical practices, processes, and structures by embedding computing capacity into physical components and by digitally incorporating data, knowledge, and resources that were previously disconnected. The resulting digitalized services and goods can be easily accessed and consumed on a massive scale because they give users the ability to circumvent costs and risks that are associated with physical components and relationships. The advent of nomadic computing era had witnessed a growing number of digital innovations, such as peer-to-peer ride sharing, home automation, and crowd funding, which disrupt traditional industries and transform the way people live and work Nan asserted.

According to Nan mobile money (MM) refers to the use of information and communication technologies and non-bank retail channels to extend the delivery of basic financial services to people, especially the low-income population, who are marginalized from formal financial services. MM has been argued to be transformative in developing countries because the disruptive mobile financial services can fill the financial services gap, which is mainly due to the poor formal financial infrastructure and limited informal financial services approaches (Mas, 2010; Evans and Pirchio, 2015; Aron, 2018; cited by Nan 2019).

**The Effect of Mobile Money on Savings Behaviours of the Financially Excluded** - According to Skogqvist (2019) in developing countries where financial inclusion is very low, many individuals and households rely on informal means of saving such as saving "under a mattress", saving in jewels or livestock, saving in groups made of friends or relatives such as merry-go-rounds where individuals come together and contribute a given amount of money in a rotatory system. As stated by (Steinert *et al.*, 2018) cited in Skogqvist (2019), the adoption of Mobile Financial Services (MFS), also known as mobile money, has revolutionized and strengthened the financial infrastructure and services by providing households and individuals the opportunity to save, spend and transfer money through short messaging service (SMS) without formal bank accounts (Hove and Dubus, 2019).

However, Skogqvist's literature investigated whether the use of mobile money affects the savings patterns of individuals that are vulnerable to financial exclusion, that is, the low-income earners, low-educated, women and rural habitants. The literature found out that users of mobile money are 1.96 more likely to have a savings product than those that do not use mobile money, and that the propensity for users of mobile money to save for emergencies and for future events is 1.44 and 1.27 times higher, respectively, as compared to the non-users (Skogqvist, 2019). According to Skogqvist these findings suggest that individuals that use mobile money perceive it as a trustworthy, efficient and reliable store of value, especially making savings for future use. This analysis also finds statistically significant evidence suggesting that mobile money use significantly increases the propensity to save for individuals in demographic groups that are



more susceptible to the unique challenges that lower accessibility to formal financial services. Therefore, by increasing the probability of individuals in the female, low income, low education and rural groups to save, mobile money fosters financial inclusion which is essential in the realization of the Sustainable Development Goals such as reducing poverty, increasing equality and sustained economic growth among others Skogqvist asserted.

**The Real Effects of Mobile Money: Evidence from a Large-Scale Fintech Expansion** - In their literature Patnam and Yao (2020) noted that despite increased access to finance, the effective use of financial services remains low in India. The World Bank Global Index Database (2017) reports that only 20 percent of adults in India save with a financial institution. Even within the population possessing a bank account, nearly half 48.5 percent of the accounts remain inactive (Patnam and Yao 2020), making India the country with the highest inactivity rate in the world in the 2017 survey. Moreover, only about 39 percent of the survey respondents reported sending or receiving domestic remittances using a financial institution. The bulk of remittance transfer are conducted with cash, either personally or using the network of relatives and friends (Demirguc-Kunt and others, 2018) as cited by (Patnam and Yao 2020)

Patnam and Yao argued that Mobile money and digital wallets offer an innovative technological solution to fill the financial infrastructure gap and alleviate frictions related to the limited use of formal financial services. This according Patnam and Yao is because, the use of mobile money allows consumers to perform financial transactions in a relatively inexpensive and reliable way eliminating spatial and temporal barriers, and can be used as a storage mechanism by both the banked and unbanked.

**The Impact of Digital Infrastructure on the Sustainable Development Goals: A Study for Selected Latin American and Caribbean Countries** - Zaballos *et al.*, (2019) research identified the impact of digital infrastructure on Sustainable Development Goal in selected Latin American and Caribbean (LAC) region. The 2030 Agenda for Sustainable Development, adopted by 193 heads of government at the United Nations General Assembly in September 2015, represents a holistic approach to transforming the world. It is designed as a plan of action for addressing the development challenges that affect mankind and the planet. As its bedrock, the plan encompasses a comprehensive set of 17 SDGs which integrate the economic, social, and environmental dimensions of sustainable development.

Zaballos *et al* pointed out that there is a gap between the outcomes achieved for each SDG in the LAC countries studied and those achieved in Organisation for Economic Co-operation and Development (OECD) countries. Moreover, LAC countries according to Zaballos *et al* still have a long way to go to achieve the SDG targets set in the 2030 Agenda for Sustainable Development. In their study Zaballos *et al* explained how investment in digital (especially telecommunications infrastructure can help close the gap between the region and these two benchmarks (OECD countries and the SDG targets). The literature also quantifies the investment in telecom in the region between 2008 and 2017 and estimates the investment necessary to close these gaps. According Zaballos *et al*'s literature, investment in technology can improve social and development outcomes in a country through several channels. Internet access and enhanced telephone communication can improve access to information on employment and education, which will increase the chances that people can lift themselves out of poverty (SDG 1). Digital infrastructure and Internet of Things (IoT) technologies can enhance agricultural sustainability and improve food security (SDG

2). Telecom can also help reduce income inequality by connecting remote areas with cities and providing less developed countries and rural communities with work opportunities and free access to knowledge (SDG 10). This analysis found that digital infrastructure has a significant and measurable impact on several SDGs when the effects of other relevant variables are considered. The variable defining the SDG was correlated with several other variables, including investment in digital infrastructure, investment in other utilities, unemployment, and other specific variables which relate to the specific SDG, such as, public expenditure on health as a percentage of GDP. In practice, this would mean that, for example, if investment in digital infrastructure were increased by 10 percent in a year in all the countries in the study (all else being equal), around 375,000 people in the region under study would be lifted out of poverty and around 360,000 people in the region would cease to suffer from hunger Zaballos *et al.*, (2019).

Additionally, Zaballos *et al* argued that for many SDGs (SDG 1, 2, 3, and 10), the impact on achieving the SDGs of a marginal increase in mobile investment or investment in digital infrastructure is like (and in some cases even larger than) that of a marginal increase in expenditures on utilities. There is quantitative evidence of the effect of telecom infrastructure on achievement of SDG 4 (Quality Education), SDG 5 (Gender Equality), and SDG 9 (Industry, Innovation, and Infrastructure), although its magnitude is more difficult to measure from the available information.

**Why do we need new innovation approaches for the Sustainable Development Goals?** - As the (UNCTAD, 2017) pointed out the 2030 Agenda for Sustainable Development puts forward a broad and ambitious agenda for global action on sustainable development. The scale and ambition of the Sustainable Development Goals require innovation in development and innovation for development. To achieve the Goals by 2030, new modalities for development are required, including bringing innovation into the foreground of development projects. Innovation, understood as new forms of social practice and organisation, as well as new or improved technological products and processes, is not only an explicit focus of Goal 9 (build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation) but also a key enabler of most – if not all – of the Goals. For example, science, technology and innovation will play an essential role in achieving Goal 2 (end hunger, achieve food security and improved nutrition and promote sustainable agriculture). The ambitious nature of the 2030 Agenda – aimed at, among others, ending poverty and reducing inequality in all its forms everywhere, to promote inclusive and sustainable consumption and production systems, to provide full and productive employment and decent work for all will require fundamental changes in the ways in which energy, food, water, housing, welfare, mobility and other goods and services are delivered, distributed and consumed. The report furthered that harnessing the positive potential for innovation to address the Sustainable Development Goals will also mean recognising that some forms of contemporary innovation also contribute to environmental degradation, are disruptive of livelihoods and exacerbate inequalities.

**Towards Sustainable Digital Innovation of SMEs from the Developing Countries in the Context of the Digital Economy and Frugal Environment** - According to Yousaf *et al* (2021) the emergence of digital innovation and technologies are able to drive social and economic development. Digital innovation has shifted the traditional business economy into the digitalized one and digital transformation of the economy is highly based upon big data and the advanced technologies. Digital innovation is not a specific feature of the software organisations anymore and even the first most valuable

business organisations in the world belong to the digital sectors Yousaf *et al* emphasised. Due to the complexity and technological dynamism, it is challenging to achieve the digital innovation in the digital economy.

All types of businesses and more specifically the Small and Medium Enterprises (SMEs) face these challenges. This technological progress can maximize the opportunities for SMEs. The changes induced by the digital technologies in the organizations' business model represent a real challenge for all organisations in general and for SMEs more specifically. If the digital transformations represent an opportunity or a challenge for SMEs, they depend on how these SMEs will strategically tackle it. SMEs operating in the digital economy critically need the digital innovation for facing important challenges and for improving their technical expertise Yousaf *et al* explained. SMEs represent key participants on the market, especially during the structural change periods in the digital economy, thus it is important to analyse how they can manage in the digital economy in a sustainable way.

Yousaf *et al* therefore, referred to Digital innovation as a product, process or business model that is new or requires significant changes and it is enabled by IT. Sustainable digital innovation supports the digitalization process of the economy in a green, long-lasting and organic way. Thus, it serves the need of a sustainable future.

**Stimulating Digital Innovation for Growth and Inclusiveness the Role of Policies for the Successful Diffusion of ICT - OECD** (2016) reported commented that the digitalisation of economies and societies is progressing with the increasing adoption and use of Information and Communication Technologies (ICTs), and the continuous migration of social and economic activities to the Internet (through digital services such as social networks, e-commerce, e-health and e-government). Today, three out of four inhabitants in the OECD area have a subscription to a mobile wireless broadband service, which they use daily, and up to 95% of all businesses are now connected to the internet, with three quarters having an online presence and almost half using this platform to do e-commerce (OECD, 2015). The transformation of entire economies into digital economies will intensify with the increasing number of real-world objects becoming "smarter", thanks to their embedded software and their interconnection via the Internet of Things (IoT). The analysis of unprecedented volumes of digital data ("big data") generated in all areas of social life will be a further driver of this transformation process (OECD, 2015).

Digitalisation promises to boost productivity growth and economic competitiveness. This promise is much sought-after in current times of stagnating to declining working age population and productivity growth, and the resulting risk of a slowing of GDP growth or a "secular stagnation" as discussed in Gordon (2015) cited in (OECD, 2016) report. Recent OECD work by Andrews *et al.* (2015) shows that productivity growth of the most productive firms worldwide remained robust in the 21st century, despite the slowdown in aggregate productivity growth. This suggests that the main source of the productivity slowdown is not so much a slowing of innovation – which is continuing a pace in the most globally-advanced firms – but rather a slowing of the pace at which innovation spread through the economy, i.e. a breakdown of the diffusion machine (Andrews *et al.*, 2015) cited in (OECD, 2016).

## RESEARCH METHODOLOGY

The sample frames for the study were the populations of employees of various mobile companies with mobile money services, staff of

banks with mobile money facility and citizens with mobile money account and mobile money agents. Sampling technique is the process of selecting a representative group (sample) from the population under study. The target population is the total group of individuals from which the sample might be drawn (Saul McLeod 2019). For this study a sample size of about ninety-five (95) participants were selected from the target population. The target population cut across individuals with mobile money accounts and mobile money agents and service providers (including telecommunication companies and banks) in Freetown and its environs, the capital city of Sierra Leone using simple random sampling technique for selection.

Data sources are broadly classified into primary and secondary data. Primary data means original data that has been collected specifically for the purpose of this study meaning the data was collected from the original source first hand. Secondary data is data that has been collected already by and readily available from other sources (Manu, 2013). For the purpose of this study, the secondary data collection include – are derived from published materials; they include computerized data, internet materials, project documents, journals, newspapers, textbooks and annual published report on digital innovations for sustainable development. For primary data collection, qualitative and quantitative methods were used through the use of questionnaire administration and direct interviews. This will help the readers to understand the different variables and issues that are involved in this study.

Two methodologies were used for this study survey – pre-survey and actual-survey interviews with targeted respondents. A field survey, which entailed the administration of questionnaire after all recommendations on errors were taken into consideration in order to increase the credibility of the questionnaire. The pre-survey interviews lasted for 1 week while the field survey was conducted over a 2-week period in Freetown and its environs in February 2024. The primary data were collected using the structured questionnaire, which comprised of seven (7) sections - section A deals with the demographic features of the respondents while sections B to G focus on the profile of mobile money; the role of mobile money in people's existing financial practices and cultures; the role of mobile money agent in the mobile money ecosystem; digital innovation enabled by digital technologies has the potential to transform existing socioeconomic practices, processes, and structures for sustainable development; the effect of using mobile financial services on the savings patterns of individuals that are vulnerable to financial exclusion, that is, the low-income earners, low-educated, women and rural habitants; and the impact of mobile money transaction in achieving sustainable development goals. The questions comprised Likert type, closed- and open-ended questions that provided answers to the research questions. A final sample size of eighty-five (85) was obtained from properly and completely filled questionnaires, given a non-response rate of 10.5%. After the collected data have been coded, edited, compiled and computerised, it was analysed using SPSS version 25 to analyse the questions and statements therein.

## FINDINGS AND DISCUSSIONS

### Analyses of Data the Questionnaire

Every question/statement on each questionnaire was thoroughly checked for different types of errors before they are entered for analysis. If, in the process of identifying errors a questionnaire is found to have some missing data, the questionnaire was either rejected or accepted based on the extent of the errors. In this section

of the questionnaire, four (4) questions were posed and their analyses are presented thus.

Data were obtained from 85 respondents out of 95 questionnaires circulated; representing 89.5% response rate. The 10.5% non-responsive included improperly and uncompleted questionnaires, which were not considered for the analysis. The demographical factors revealed that the majority of the responsive respondents were female (59%) while the rest were male (41%). This disproportion in the gender of respondents could be as a result of the fact that more women were involved in the study and are users of mobile money. The analyses revealed that 23% fall under the age group 18 to 30 years, 29% fall under 31 to 40 years, 18% fall within 41 to 50 years, another 18% fall within 51 to 60 years while 12% fall under 61 years and above. The results show there is a relationship between the age of respondents and their usage of mobile money. It appears more respondents were between the age category from 18 to 40 years with 52% are active in using mobile money.

The level of education of respondents were investigated and the findings indicate that the educational qualification of the majority of respondents falls into the categories of secondary education with 35% of the respondents, those with primary education represents 18% of respondents, the respondents with tertiary education is 27%, those with vocational education accounts for 12%, while 8% of the respondents had no education. The findings show that whether or not you have formal education one can still use mobile money and no formal education is required for having a mobile money account.

On the marital status of the respondents, the majority of respondents are married and/or cohabitating which means most are staying with their partners. 35% of the respondents that are married, 24% are cohabitating. Respondents who are single accounts for 23%, those divorced make up 6%, whilst those have lost their partners account for 12%. The results from the findings show that respondents who are married and cohabitating are in majority of those with mobile money account.

**Profile of Mobile Money** - The aim of this section is to get information about mobile money transaction in which the respondents are involved, the types of mobile money services respondents are aware of, the type of services these mobile money operators provide offer; and the length of time these services have been provided.

The analysis revealed that all the respondents 100% have knowledge or are aware of the availability of mobile money services in Sierra Leone. The results show that there is a telecom sector that is well-functional and developed in terms of regulatory oversight, network accessibility, and quality, can be a key supply-related driver of mobile money innovations. 59% of respondents identified Orange money (by Orange Sierra Leone) as the most prominent service provider for mobile money services of all in the sector, 23% identified Afrimoney as the second choice, 12% identified splash money while only 6% identified other mobile money service providers, which are not very popular. The results indicated majority of respondents are more aware of Orange money services compared to other mobile money services identified. On the type of services offered by these mobile money service providers, 6% of respondents indicated payments to suppliers, 8% indicated payments from customers, 9% indicated purchase of airtime, 12% of respondents identified saving on mobile money, 12% identified payments of utility bills, 21% of the respondents indicated transfer and withdrawal of money from personal mobile money account, 26% identified all the aforementioned multiple services while only 6% indicated payments to registry and mobile money account for customers. This results

show that 26% of respondents are fully knowledgeable of all the different types of services offered by the mobile service providers. On the length of time the respondents have been subscribing to these services, 12% stated that the services provided by their mobile money provider have been offering these services for about 1 to 3 years, 23% of respondents stated for about 4 to 8 years, 41% stated 9 to 12 years, 12% stated 15 years and above while another 12% stated they had no idea the length of time these services have been offered.

**The Role of Mobile Money in People's Existing Financial Practices and Cultures** - The objective of this section is to investigate the role of mobile money in people's existing financial practices and cultures and it borders on the following: whether respondents have used mobile money before; the motivation for using mobile money; whether respondents' mobile money account is linked with their bank accounts; and the means of preferred savings.

The results revealed that 74% of the respondents confirmed that they had used mobile money while 26% stated they had not used it before. This is a positive indication from mobile money subscribers and that its usage is not new in Sierra Leone as people have knowledge on the usage of mobile money. In terms of motivation, the results revealed several, 32% of respondents indicated easy accessibility was common, these findings are consistent with the views of (Lashitew *et al.*, 2019) that in 2016 the number of people with mobile accounts has grown to half a billion globally, out of which 277 million were found in Sub-Saharan Africa.

About if mobile money is linked to their bank accounts, the results indicate that majority of the respondents about 82% said their mobile money account is not linked with their bank accounts. This implies that majority of the respondents do not even have bank account and these findings confirm the views of (Lashitew *et al.*, 2019) that in Sub-Saharan Africa mobile phone penetration have reached 76%, whereas the percentage of people with bank accounts remains less than 30%. Similarly, respondents were asked their preferred means of savings, the results indicate that 69% of respondents prefer saving with mobile money savings account to traditional banking system and these results are in consistence with the findings of (Kavak and Anwar 2019) that the advent of mobile payment technology shows that it has a high number of benefits, but it does not match with the current adoption rate, that the majority of users of mobile payment use it to for smaller transactions such as the purchase of books and food.

**The Role of Mobile Money Agent in the Mobile Money Ecosystem** - This section is aimed at examining the role of mobile money agent in the mobile money ecosystem. The findings on the role of mobile money agent indicate that there are series of roles identified by respondents as the role of mobile money agents but 47% of respondents said the role of mobile money agent is mainly to transfer and withdraw money for customers and this is the highest percentage among the roles identified by respondents. These findings are consistent with the views of (Nan, 2019) that a transactional agent, that would have otherwise little to do with banking services, now function as "a bank branch in the neighbourhood to transfer and withdraw money for customers. Similarly, respondents were asked whether agents execute their work in line with the guidelines they may have received from the company they serve as agent for. The results revealed that 59% of respondents answered yes that agents execute their work in line with the guidelines they may have received from the company. Moreover, respondents were asked whether agents are well trained by their parent company, the results indicate that 80% of respondents said yes agents are well trained by their parent company and these results in line with the views of (Tuwei, 2018) that company looks to agents to explain to clients about the existence of

new services. For customers who do not know how to execute any operation of mobile money such as sending, depositing or withdrawing money, agents take them through the process. This implies that parent companies have properly trained agents to carry out the transaction process.

### **Digital Innovation Can Transform Existing Socio-economic Practices, Processes, and Structures for Sustainable Development**

The aim of this section is to set out the survey results on whether digital innovation enabled by digital technologies has the potential to transform existing socio-economic practices, processes, and structures for sustainable development. The first question under this section hinges on whether or not mobile money can play a key role in reducing the cost of remittances and the achievement of SDG 9. The findings revealed that 59% of respondents agreed that mobile money can play a key role in reducing the cost of remittances and the achievement of SDG 9. This finding conforms to the finding of (David-West *et al.*, 2019) that mobile financial service is proving to be an essential tool for creating and delivering value to the bottom of the pyramid segment. Mobile money has also provided a lifeline to distressed individuals and households through digital humanitarian cash transfers and affordable international remittances

Also, respondents were asked on whether or not by enabling faster, cheaper and safer financial transaction mobile money can help to achieve other SDGs. The results revealed that 63% of the respondents agreed with the statement that by enabling faster, cheaper and safer financial transaction mobile money can help to achieve other SDGs. These findings are consistent with what (Lopez, 2019) earlier expressed that Mobile Money has been central to the industry's contribution to many of the SDGs. The Global Goals provide a unified and integrated framework to understand how mobile money is contributing to sustainable development. That mobile money has evolved into a broader payments platform that provides access to life-enhancing services, such as healthcare, education, employment, transportation and social protection. At a macro level, mobile money fuels economic growth by facilitating savings and investments, creates employment, drives business productivity and entrepreneurship, helps formalise the economy and provides stability during economic downturns. Mobile money is a key driver of socio-economic growth and is becoming a gateway to the digital economy. As national economies become increasingly dependent on digital technology, the power of mobile money to harness digital finance for sustainable development is strengthening

Respondents were again asked whether or not digital innovation can lead to socio-economic transformation, the results indicate that 67% of the respondents agreed to the statement and these results are consistent with the views of (Nan, 2019) that Digital innovation enabled by digital technologies has the potential to transform existing socioeconomic practices, processes, and structures. That Mobile Money according to Nan has been transforming the way people conduct financial transactions (i.e. money transfer and storage) and that MM, when widely adopted in a society, can serve as a digital pathway for developing countries to leapfrog the traditional financial services gap and achieve socioeconomic development. Also, on whether or not mobile money can help to improve the financial status of people. To know whether there is financial growth with the use of mobile money presented that 53% of respondents agreed with the statement. These findings imply that half of the respondents agreed with the statement that mobile money can help to improve the financial status of people. To know whether there is financial growth with the use of mobile money. Similarly, results on the statement on whether or not mobile money usage can increase access to other financial services shows that 65% of respondents agreed to the

statement that mobile money usage can increase access to other financial services and these findings are in support of the views of (David-West *et al.*, 2019) that mobile money services have also facilitated access to credit and enhancement of supply chains to micro-entrepreneurs such as smallholder farmers, while also closing the gender gap in access to financial services, especially in the places where culture and religion prohibit women from being able to come out and access basic financial services or make simple business transactions.

Additionally, respondents were asked on whether or not mobile money can help to boost financial inclusion in the rural areas. The findings indicate that 71% of the respondents agreed to the statement that mobile money can help to boost financial inclusion in the rural areas. These findings confirm the opinions of (Kikulwe *et al.*, 2014) and that of (Akinyemi and Mushunje, 2020) that in African countries, particularly in rural areas, there is evidence that suggests that mobile money has improved rural household incomes through remittances from urban areas. That the fact that the use of mobile money funds is protected by Personal Identification Numbers (PIN codes) makes it a secure means of savings for rural populations who have limited access to formal financial institutions and face risks caused by traditional means of money transfer and savings.

**Effects of Mobile Money on the Savings' Patterns of Individuals that are Vulnerable to Financial Exclusion** - This section assessed the effect of using mobile financial services on the savings patterns of individuals that are vulnerable to financial exclusion, that is, the low-income earners, low-educated, women and rural habitants.

Respondents were asked about the effects of using mobile financial services on the savings' patterns of individuals that are vulnerable to financial exclusion. The results indicate that 42% of respondents identified that mobile money helps in receiving remittances and transfer payments conveniently (perceived ease of use) as the common effects of using mobile financial services. These findings are consistent with the findings of (Skogqvist, 2019) that individuals that use mobile money perceive it as a trustworthy, efficient and reliable store of value, especially making savings for future use. This analysis also finds statistical significant evidence suggesting that mobile money use significantly increases the propensity to save for individuals in demographic groups that are more susceptible to the unique challenges that lower accessibility to formal financial services. Therefore, by increasing the probability of individuals in the female, low income, low education and rural groups to save, mobile money fosters financial inclusion which is essential in the realization of the Sustainable Development Goals (SDGs) such as reducing poverty, increasing equality and sustained economic growth among others. Again, respondents were asked if they feel safe carrying large amounts of money in your mobile money wallet. 73% of the respondents feel safe carrying large amounts of money in your mobile money wallet, and these findings are in line with the findings of (Akinyemi and Mushunje, 2020) that mobile money is easier, safer, more trustworthy, more convenient, and faster and the usage of mobile money funds is protected by Personal Identification Numbers (PIN codes) which makes it secure. These findings also conform to the report of (PHB Development, 2013) that in Sierra Leone, one of benefits of mobile money is speed and invisibility (no-one knows you have money on your phone).

**The Impact of Mobile Money Transaction in Achieving Sustainable Development Goals** - This section examines the impact of mobile money transaction in achieving sustainable development goals. First, respondents were asked whether or not mobile money increases disposable household income and the responses indicated

that 65% of respondents agreed that mobile money increases disposable household income. The findings revealed that majority of the respondents agreed to the statement. These findings are consistent with the views of (Lopez, 2019) that mobile money increases the ability of households to save and withstand unexpected life events that affect income or assets, such as job loss, health problems or environmental and economic shocks.

Second, respondents were asked to identify the challenges involved with mobile money transactions, the results reveal that 32% of respondents identified poor service and system quality as the challenge involved with mobile money transactions. This implies that though there are other challenges identified but quite a good number of respondents identified poor service and system quality as the common challenge involved with mobile money transactions. Finally, 29% of the respondents of each identified accurate market segmentation and reduced business cost as the most disruptive effect of digital innovation, these findings are inconsistent with the findings of (Yousaf *et al.*, 2021) that referred to digital innovation as a product, process or business model that is new or requires significant changes and it is enabled by IT. Sustainable digital innovation supports the digitalization process of the economy in a green, long-lasting and organic way. Thus, it serves the need of a sustainable future. The regular digital innovation addresses performances, costs, technology and attractiveness to customers and business, while the sustainable one also addresses the environmental and social factors. Sustainable digital innovation tries to create value for all the stakeholders involved in the production and distribution process, it is inspired by nature, not only by technology, it reduces resources waste and targets the societal goals, not only the commercial and business goals. These findings also conform to the findings of Development Policy Forum (DPF, 2017) that the digital revolution furthermore, presents societies with a whole new set of challenges ranging from the disruptive effects of technologies such as automated jobs and employability, to digital exclusion and inequality, cyber security, data privacy and regulatory issues.

## CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

In conclusion, the general aim of the study was to investigate how the utilisation of digital innovation leads to sustainable development using mobile money as a case study. From the findings it can be concluded that mobile money is financially inclusive, and offers a great potential for financial integration. It demonstrates transformative role of digital innovation at the societal level, going beyond organizational settings. The study established an important connection between different types of variables that influences users' attitude and intention of use. The imminent factors identified in the study involves the security of the transaction, privacy and confidentiality of personal information, ease of use, environmental risk, provider reputation, mobility and utility of mobile money. Mobile money services have greatly transformed the financial inclusion landscapes in developing countries where majority have high inaccessibility to formal financial services. This study has demonstrated that mobile money users are twice as much likely to save than those that do not use mobile financial services, which calls for the need to promote saving through mobile money as this can mobilize and promote savings for female, rural and low-income groups who are highly vulnerable to financial inclusion.

However, this study has demonstrated that mobile money can be used as an instrument of increasing financial inclusion policy for women, low-educated, low-income and rural residents. From findings in the literature, it is evident that mobile money has been driving

financial and digital inclusion in many developing countries. Today, mobile money is set to become the backbone of payments in the digital economy, facilitating platform solutions and driving innovation and economic growth. The empirical findings in this research have shown, mobile money is positioned to be one of the leading forces of digital finance to achieve the SDGs. Mobile money has the power to tackle some of the world's most intractable problems while also unlocking new paths to sustainable development. To harness this power, partnerships and cross-sector collaboration are required.

### Recommendations

Based on the findings emerging from empirical investigation the following recommendations are suggested:

- It was revealed in the study that the motivation for using mobile money is because of easy accessibility. On this note, it is important that developers and mobile money operators improve the mobile money usage environment. The developers should ensure that the mobile money transaction interface is interactive and easy to use;
- The study revealed that the role of mobile money agent in the mobile money ecosystem involves the transfer and withdrawal of money for customers. Mobile money agents would do well to keep and maintain the level of trust customers have in them as a service provider. Mobile money service providers should therefore endeavour to improve consumer education on privacy and confidentiality of personal information through constant training of mobile money transaction agents;
- The findings in the study revealed that mobile money can play a key role in reducing the cost of remittances and the achievement of SDG 9. In order for this to be achieved there should be increase in disposable household income: by driving investment in agriculture and access to food; increasing access to health care; providing access to energy services; enhancing women's financial independence; and converting savings into investment. By enabling faster, cheaper and safer international remittances, mobile money helps to achieve other SDGs as well;
- The study also revealed that the effect of using mobile financial services on the savings patterns of individuals that are vulnerable to financial exclusion, that is, the low-income earners, low-educated, women and rural habitants can be achieved in receiving remittances and transfer payments conveniently (perceived ease of use) and by feeling safe carrying large amounts of money in their mobile money wallet. In order for this to be achieved agents must understand the financial position of their clients by cooperating with them in shortening the remittance process to reduce cost. For example, instead of agents allowing customers to do peer to peer transfer through an agent, they can encourage customers to do this directly by themselves. This will make customers feel safe to do transactions easily; and
- In the study poor service and system quality were identified as the challenges involved with mobile money transactions. The mobile money service providers should therefore endeavour to improve on their services and system quality by upgrading their system to more improve technology to provide better service to their consumer. The government on the other hand should improve on policies and regulation on mobile money usage. The policies should get aligned to the prosecution of mobile transaction frauds. Thus, enacting laws and policies that increase the use and access of mobile money as a savings mechanism in developing countries could have a positive impact on the economic wellbeing of these marginalized groups and the country as whole.

The study concludes that while mobile money is positioned to be one of the leading forces of digital finance to achieve the SDGs; it can also play a key role in reducing the cost of remittances and the achievement of SDG 9; and that by enabling faster, cheaper and safer financial transaction mobile money can help to achieve other SDGs.

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