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Mobile financial services, financial inclusion, and development: A systematic review of academic literature

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Abstract

With the flagship success of m-Pesa, financial services via mobile devices have become an important tool to facilitate the financial inclusion of the previously unbanked population in developing countries. Attempts to provide a landscape of academic research findings at the intersection of mobile financial services, financial inclusion, and development have been rather scant. To determine the key issues and gaps in the current academic research, this study conducts a systematic review of 54 academic research papers *vis-à-vis* the nexus of mobile financial services, financial inclusion, and development. The results show that the extant literature addresses three major clusters of topics: delivery, environmental factors, and the impact of mobile financial services. Still in the nascent stage of research, the topics covered in the literature indicate a bias towards institutional and individual preconditions for the implementation of mobile financial services, rather than actual supply and demand by users, and its impact on society. The choice of research methods also shows limited variety and depth. This study contributes towards understanding the existing research on mobile financial services for financial inclusion in developing countries and finding research gaps for future study.

KEYWORDS

access to finance, developing countries, development, financial inclusion, mobile financial services, mobile phones

1 | INTRODUCTION

Financial inclusion, or the provision of financial services at affordable costs to the disadvantaged and low-income segments of society, is currently considered to be one of the major enablers of economic development (Demirgüç-Kunt & Klapper, 2012; World Bank, 2017). However, approximately two billion adults internationally have no access to the financial services delivered by formal financial institutions (World Bank, 2014, 2017). At the World Bank Group-IMF meetings in 2015, global multi-stakeholders across the public and private sectors pledged their commitment to the promotion of financial inclusion and announced a new global development goal of achieving Universal Financial Access by 2020 (UFA, 2020).

Notably, mobile devices have become an important tool to promote financial inclusion for the previously unbanked population in developing countries (Kanobe, Alexander, & Bwalya, 2017). Owing to their unique features such as mobility, always-on availability, and personalised small devices, mobile phones have rapidly diffused not only in developed countries but also in most developing countries to overcome geographical and socio-economic barriers. However, while the number of mobile-based financial services (MFS) is increasing, many of them are far from reaching a stage of sustainable value and profit, as they fail to offset the cost of setting up infrastructure and maintenance (Evans & Pirchio, 2014).

In the context of proliferating MFS initiatives and their frequent failures, mobile-based financial inclusion has become a topic of scholarly interest over the last decade. Despite a growing body of literature on MFS initiatives, there have been scant attempts to provide a systematic overview of research findings focusing on the interplay of mobile financial services, financial inclusion, and development. Given the complex

nature of MFS as a convergence of mobile and financial services, MFS as a topic of research warrants investigation on a broad range of issues surrounding the seamless connection and coordination of these different sectors. Furthermore, research is necessary to illuminate the unique context of developing countries, where MFS is emphasised as a means to financial inclusion. In this regard, by conducting a systematic review of extant academic literature, this study aims to provide a rigorous mapping of the existing knowledge and empirical evidence from academic research, focusing on the nexus of MFS, financial inclusion, and development. Hence, this study aims to not only fill the research gap but also contribute to the evidence-based policy-making and practices on inclusive MFS by contouring the broad landscape of current knowledge, as well as suggest the key factors which affect the successful integration of MFS, financial inclusion, and development. With these objectives in mind, this study asks the following: (1) what are the key factors affecting MFS as a means to provide inclusive financial services in developing countries, and (2) what are the current research gaps in the literature addressing MFS, financial inclusion, and developing countries?

The rest of the paper is organised as follows. In Section 2, we explore the interconnection between MFS, financial inclusion, and development as stated in the existing literature. Section 3 explains the research methods and approaches used in the paper, followed by the detailed results of our analysis in Section 4. We identify the key factors and research gaps in Section 5 and conclude with suggestions for future research in Section 6.

2 | MOBILE FINANCIAL SERVICES, FINANCIAL INCLUSION, AND DEVELOPMENT

2.1 | Mobile devices and development

There is a plethora of research that examines the positive impact of information and communication technology (ICT) on development (World Bank, 2012; Kpodar & Andrianaivo, 2011; Cecchini & Scott, 2003). In recent years, with the explosive diffusion of mobile services in the Global South, mobile devices are increasingly considered to be an effective enabler of development (Kpodar & Andrianaivo, 2011). On top of the economic benefits of mobile proliferation in developing countries (Waverman, Meschi, & Fuss, 2005), existing literature suggests two main characteristics of mobile devices linked with development. First, “mobility” grants users of a mobile device the ability to access services regardless of their physical location, while reducing the cost of communication and transportation (Sarker & Wells, 2003). It connects individuals to other individuals and provides personalised channels of communication, knowledge, and innovative services at the convenience of the users, reaching beyond geographical barriers. Second, the inherent “flexibility” allows mobile devices to operate various types of applications (Beddall-Hill, Jabbar, & Al Shehri, 2011) applicable to various industry sectors such as agriculture, manufacturing, and logistics (Qiang, Kuek, Dymond, Esselaar, & Unit, 2011), as well as labour market efficiency (Aker, 2010). Considering these two characteristics, it has been suggested that mobile devices bring about positive effects on development by increasing information access points and expanding the scope of service applications and fields.

2.2 | Financial inclusion and development

The term “financial inclusion” has gained importance since the early 2000s as research findings suggest that financial exclusion increases the risk of poverty (Shiimi, 2010). In this paper, *financial inclusion* is defined as *a delivery of useful and affordable financial services at affordable costs to disadvantaged and low-income people in a sustainable way* (Muzigiti and Schmidt, 2013; World Bank, 2017).

Financial inclusion could affect economic development positively at the household, firm, and national levels. Increased financial access through effective financial inclusion programmes can facilitate a greater level of investment by households to improve their assets, which is associated with productivity and can increase household income in the future (DFID, 2004). In addition, improved financial inclusion, or more specifically, increased access to credit, may affect economic growth by facilitating the entry of new firms (Klapper, Laeven, & Rajan, 2004) who would otherwise be constrained by their lack of inherited wealth, and limited networking with well-off incumbents. At the national level, an inclusive financial system makes available more resources for investment, especially for the promotion of small and medium enterprises (SMEs). It can also create employment opportunities, ensure economic and financial stability by reducing vulnerability, and contribute towards poverty reduction (Morduch & Haley, 2002).

Nevertheless, such benefits of financial access are only limited to the developed world, as most developing countries experience a deficiency of access to financial services. According to the World Bank (2012), the provision of financial accounts differs enormously between high-income and developing economies. The poor who live in the rural areas of developing countries tend to have lesser access to financial services due to the lack of infrastructure and poor economic conditions (SantaMaria, 2016).

2.3 | Mobile phones and financial inclusion

Mobile financial services (MFS) usually indicate the use of a mobile phone to access financial services. In recent years, MFS have been recognised as an innovative and effective means to achieve financial inclusion by providing new financial services to excluded people (Sihvonen, 2006). Previous literature identifies the typology of MFS and the different ecosystems within which they operate. Indeed, MFS encompass various financial services such as mobile banking, mobile payment, mobile money transfer, and mobile international remittance services. Mobile banking is a service that provides customers with a channel to interact with a bank via a mobile device (Barnes & Corbitt, 2003). Mobile payment, on the other hand, involves the use of a mobile device to make payments for goods or services either at the point of sale or remotely (KPMG,

2011), and it is increasingly being used in developed countries. Mobile money transfer, as in the case of m-Pesa in Kenya, is also popular in developing countries where users have reduced access to bank accounts but have a high demand for sending and receiving money between people. Money remittance refers to an international money transfer, often used by migrant workers who send money to their home country. There is real potential that money remittance services may shift from traditional providers to wireless carriers who are able to compete for the consumer market share on the basis of technological ubiquity and lower cost of services (Merritt, 2011).

In the ecosystem of MFS (Figure 1), there are six main actors involved in the delivery of services. Customers, at the centre of this system, perform transactions with their mobile devices by running an application provided by mobile financial networks (Victor, 2014). Mobile network operators play a critical role in offering MFS (Ramos, Solana, Buckley, & Greenacre, 2016). Banks usually serve as important actors who convert virtual mobile money into physical money and deposit the balance of customers' mobile money by providing trust accounts to customers. According to Harry, Sewchurran, and Brown (2014), partnerships between mobile network operators and banks as the dominant players in the environment of MFS are crucial in providing the services. Merchants pay certain fees to banks because, as entities or institutions, they are frequent recipients of fund transfers when they receive payments from a consumer or a business firm at the point of sale. Agents are an interesting stakeholder and unique in the context of MFS, working as over-the-counter service points, providing savings and withdrawals for customers (Davidson, 2011). Last but not the least, regulators have the greatest impact on the mobile money ecosystem (Varshney, 2014). They develop both guidelines and policies that cover the areas of value creation, innovation, and efficiency, and also take up the role of supervising the enforcement of compliance.

In sum, previous literature reports the integration of mobile technology and financial services in developing countries, and addresses their structure and workings in practice. However, while the three keywords of MFS, financial inclusion, and development have been frequently studied in combination, there has been a limited attempt to explore the intersection of all three topics. Given the complexity arising from the integration of mobile technology and financial services which may be the result of relatively weaker institutional and technological capacities in developing countries, it is important to identify the key issues from a broader landscape encompassing the three topics. This will allow us to understand the current status of our knowledge, research overlaps, and gaps, and evaluate the emerging research agenda surrounding the three keywords. While Donner and Tellez (2008) and Duncombe and Boateng (2009) offer an integrated view of all three topics, their findings cover only the initial development of MFS and are not updated. Shaikh and Karjaluo (2015), on the other hand, focus on mobile banking and offer a limited scope for our purpose of canvassing a variety of MFS, including, for example, mobile payment. To fill this gap, we review the existing research at the intersection of MFS, financial inclusion, and development; identify the missing analytical links connecting the three concepts; and draw out implications for future studies.

3 | RESEARCH METHODS AND RESULTS

3.1 | Systematic review

This study adopts a systematic review, a type of literature review method aimed at providing a complete and exhaustive summary of current literature regarding the research question, by collecting relevant articles from databases. Given the purpose of this study, to identify the key issues and research gaps encompassing the three keywords of MFS, financial inclusion, and developing countries, a systematic review offers the advantage of making a thorough examination of extant research. By summarising and synthesising the knowledge from prior studies systemically (Okoli, 2015), a systematic review helps us map out a landscape of factors affecting mobile financial inclusion in developing countries, and identify gaps from a broader perspective. Furthermore, in the field of international development, the systematic literature review has been suggested as *"the most reliable and comprehensive statement about what works"* when it comes to international development policy and practice, facilitating evidence-based policies for development (Mallett, Hagen-Zanker, Slater, & Duvendack, 2012).

We combine the three-stage procedure of Tranfield, Denyer, and Smart (2003) and the guide by Siddaway (2014) to conduct the review in the following sequence: (1) preparation: scoping, planning; (2) execution: searching, screening, eligibility, and synthesis; and (3) reporting: results.

In the preparation stage, we identified three key concepts, namely *"mobile financial services"*, *"financial inclusion"*, and *"development"*, and created search terms for the three concepts to extract relevant papers. For *"mobile financial services"*, alternative search terms include the various

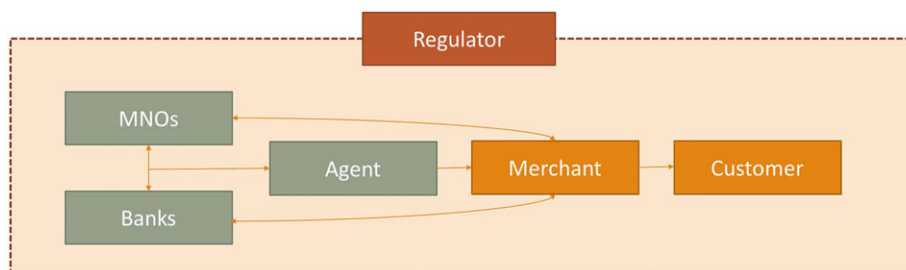


FIGURE 1 Ecosystem of mobile financial services

financial services enabled by a mobile device, such as “mobile money”, “mobile payment”, “mobile transaction”, “mobile wallet”, and “mobile banking”. In order to include the alternative terms of “mobile financial services”, we used the search term “mobile*”, which covers all types of MFS. For “development”, both “developing countries” and “development” were included. Therefore, we also used the search term “develop*” in order to include “development” and “developing countries”. Lastly, the term “financial inclusion” is interchangeably used with terms such as “access to finance”, “financial access”, and “increased financial services”, which led to the use of the above four terms including “financial inclusion”.

Next, we identified the following exclusion criteria: articles not written in English, articles not published in a peer-reviewed journal, articles in which the terms “financial inclusion” or “mobile money” are not treated as a major theme or just treated as a marginal topic, and articles not geographically covering “developing countries” or mid- or low-income countries in Asia, Africa, Middle East, or Latin America.

In the execution stage, the article search was conducted using two major electronic databases: Web of Science and Scopus. The data capturing period was from 23 May to 30 May 2017. The article search used the following four combinations of search keywords:

- 1 “mobile*” and “financial inclusion” and “develop*”.
- 2 “mobile*” and “financial access” and “develop*”.
- 3 “mobile*” and “access to finance” and “develop*”.
- 4 “mobile*” and “financial service*” and “develop*”.

The search of Web of Science and Scopus resulted in 58 articles and 203 articles, respectively. Next, the duplicated articles and those that fell under the exclusion criteria were eliminated. Then, we conducted abstract reviews so as to extract the articles focusing on all the themes of “financial inclusion”, “mobile financial services”, and “development”. As a result, the remaining 54 articles were selected for the full-text review (Figure 2). The selected articles are listed in Appendix 1.

3.2 | Results

Academic research pertaining to MFS, financial inclusion, and development started appearing in journal publications in 2008, and the number has gradually increased since (Figure 3). Five articles were published in the first quarter of 2017; the expected number of 2017 publications, shown in the dotted line in Figure 3, appears to be around 20, which is a significant number of publications compared with that of the past. In terms of regional focus (Figure 4), almost half of the articles (26) focused on the Africa region, including Kenya, Ghana, Sudan, Zimbabwe, Jamaica, Uganda, and Nigeria. Among the 26 articles, nine focused on Kenya, where the phenomenal growth of MFS, with the success of M-Pesa (Mbogo, 2010; Mas & Morawczynski, 2009), may have ignited scholarly attention to the country.

Regarding research methods (Figure 5), 30% of the articles (16) used quantitative methods, while approximately 70% of the articles (32) used qualitative methods. Among the qualitative studies, document analyses and descriptive case studies were the most common. The articles using quantitative methods mostly present descriptive statistics or adopt a basic regression model.

When it comes to data sources (Figure 6), the selected articles utilise secondary data twice as often as articles utilising primary data. Methods for the collection of primary data vary, but include in-depth interviews, focus group interviews, and surveys. Other articles, based on secondary

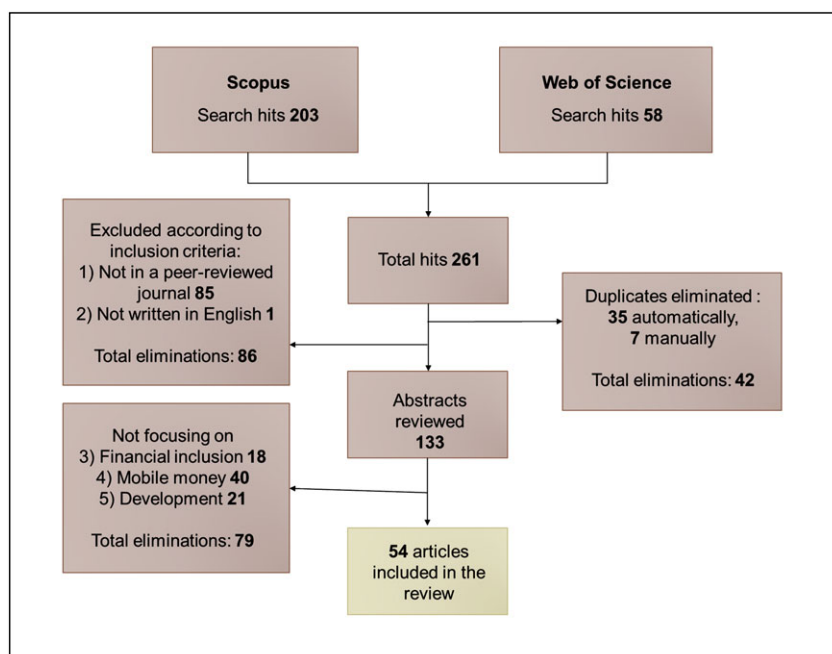


FIGURE 2 Procedure of a systematic review

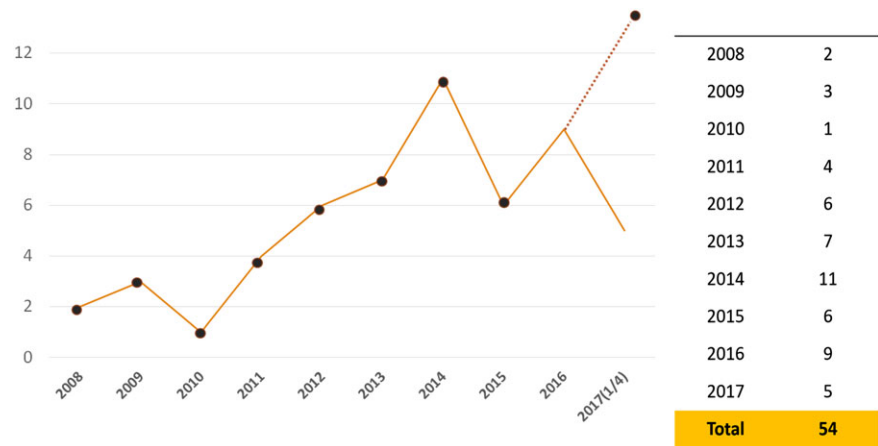


FIGURE 3 Number of articles by year

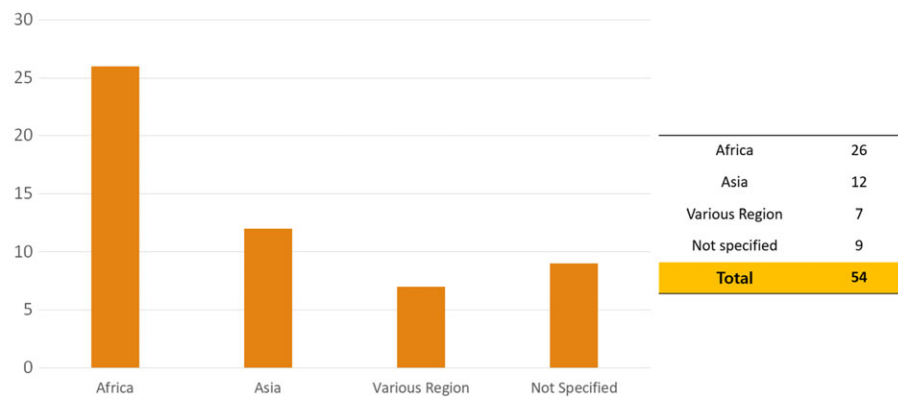


FIGURE 4 Number of articles by region

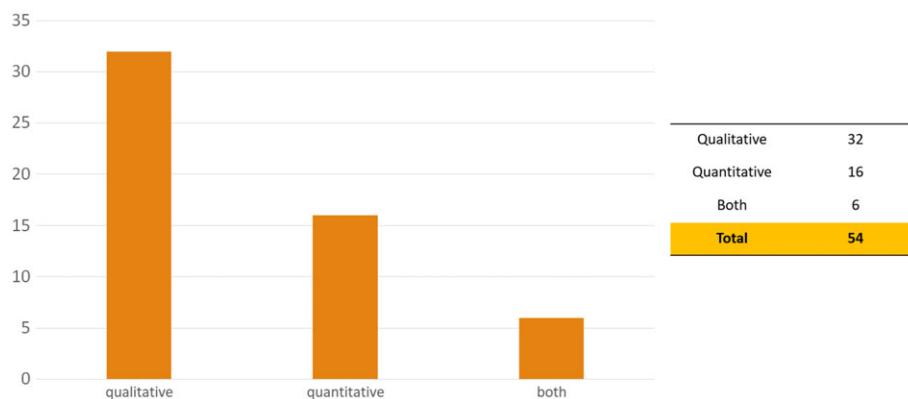


FIGURE 5 Number of articles by method

data, acquired the data from diverse sources such as the Financial Access Survey, GSMA's Mobile Money programme,¹ and Consultative Group to Assist the Poor (CGAP).²

4 | FINDINGS

In this section, this paper classifies the literature by the research themes discussed in the selected articles and then examines key issues related to each of the themes (Figure 7).

¹<https://www.gsma.com/aboutus/>

²<http://www.cgap.org/about>

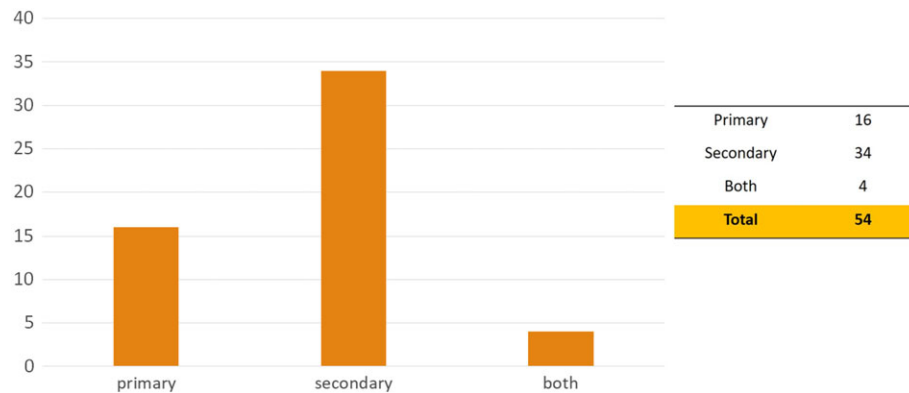


FIGURE 6 Number of articles by data source

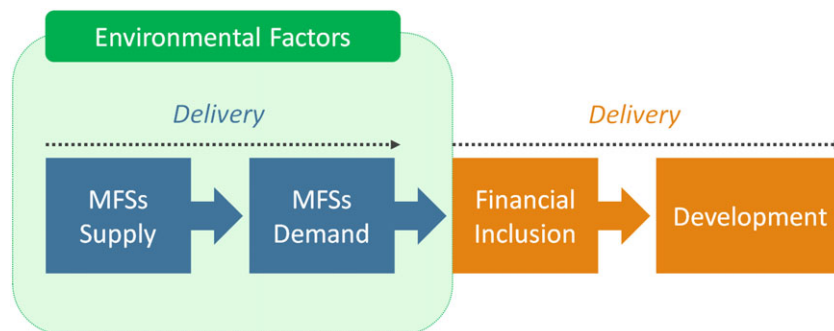


FIGURE 7 Process of delivering mobile financial services to the impact clusters

We categorise the articles according to the conceptual model which describes the process of MFS delivery, and in turn contributes to development. In the studied literature, this process is usually examined in three clusters: delivery, environmental factors, and impact (Table 1). The first cluster is MFS delivery, consisting of the dual aspects of supply and demand. The second cluster refers to those environmental factors which significantly influence both supply and demand sides when delivering MFS. The last cluster addresses the impact of MFS on development. Such a classification helps us to identify recurring themes and the salient points of the arguments that emerge from actual MFS operations. Of the selected articles, we exclude three literature reviews from the above categorisation: Donner and Tellez (2008), Duncombe and Boateng (2009), and Shaikh and Karjaluo (2015). Their topics do not address the process of MFS, instead simply depicting the landscape of MFS for financial inclusion in developing countries.

Based on the classification of three clusters, we draw out 11 notable sub-topics which have already been commonly discussed in multiple articles (Figure 8). In the “delivery” cluster, three themes, comprising agent networks, inter-operability, and intentions, emerged as important issues on the supply side, whereas two issues, namely perceptions and usage patterns, were considered as significant factors on the demand side.

TABLE 1 Classification of the selected articles by subjects

Clusters	Subject	Article	Number of Articles
Delivery	Supply	Batchelor (2012), Chaix and Torre (2015), Christen and Mas (2009), Gómez-Barroso and Marbán-Flores (2014), Karrar and Rahman (2015), Santoso and Ahmad (2016), Sanz and De Lima (2013)	7
	Demand	Behl and Pal (2016), Bhuvana and Vasantha (2017), Deb and Agrawal (2017), Dzogbenuku (2013), Jones et al. (2014), Mago and Chitokwindo (2014), Mishra and Bisht (2013), Mwangi and Brown (2015), Osakwe and Okeke (2016), Peruta (2018), Shrivastava (2010), Wamuyu (2014)	12
	Supply and demand	Fang, Russell, and Singh (2014), Parvin (2013), Van Der Boor, Oliveira, and Veloso (2014)	3
Environmental Factor	Environmental factor and supply	Anong and Kunovskaya (2013), Cousins and Varshney (2014), Maurer (2013), Minto-Coy and McNaughton (2016)	4
	Environmental factor and demand	Alafeef et al. (2012), Ammar and Ahmed (2016), Munyegera and Matsumoto (2016)	3
	Environmental factor and supply and demand	Berger and Nakata (2013), CGAP (2008), Kadišić et al. (2011), Nyandoro and Mahleko (2015), Sujata, Perumal, Zaman, and Jha (2017)	5
	Environmental factor	Anderson (2009), Heyer and Mas (2011), Johnson (2016), Johnson and Arnold (2012), Makulilo (2015), Potnis (2014), Ramos et al. (2016), Vlcek (2011)	8
Impact	Financial inclusion	Asongu et al. (2017), Hinson (2011), Maurer (2012)	3
	Development	Allen et al. (2014), Donovan (2012), Evans and Pirchio (2014), Ghosh (2016), Kikulwe et al. (2014), Vong, Fang, and Insu (2012)	6

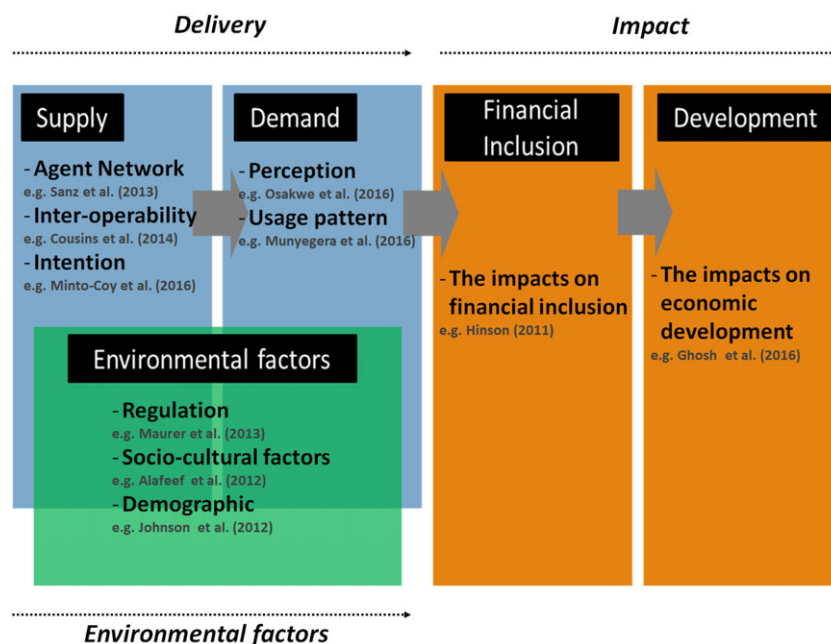


FIGURE 8 Issues regarding the existing articles relevant to mobile, financial inclusion, and development

Furthermore, in the “environmental” cluster, the issues of regulation, socio-cultural factors, and demographics were raised. Regarding the cluster of “impact”, we explore the impact of financial inclusion and development. This exercise contributes to the understanding of the academic landscape of key issues surrounding MFS, financial inclusion, and development, as well as highlighting the key factors to be considered in each of the implementation stages of MFS in practice. Below, we discuss these 11 sub-topics in turn.

4.1 | Issues on delivery

Service providers (eg, mobile carriers or banks) face various issues surrounding the delivery process of MFS to users. On the supply side, the articles focused heavily on *agent networks*, *inter-operability*, and *intentions*. On the demand side, the selected articles delved into two other major topics, namely *perceptions* and *usage patterns*.

4.1.1 | Supply: Agent networks

Agent networks generally contribute towards sustaining the ecosystem of MFS and are a distinctive feature of MFS. The agents are the actors operating in the field, who perform the crucial function of administrating cash deposits and withdrawals into an electronic money transfer system for customers (Maurer, Nelms, & Rea, 2013). Therefore, the agent network is regarded as a type of “infrastructure” for MFS. Agent networks can supplement accessibility to financial services and ease the problem of limited access observed in most developing countries (Sanz & De Lima, 2013). In order to overcome geographical barriers, some MFS suppliers have built broad agent networks composed of different types of agents, such as small shops, bank branches, and bill-payment counters. Moreover, agents can attract new clients with face-to-face advertising campaigns to promote MFS. For that reason, it is important for suppliers to hire trustworthy agents and maintain a good relationship with them (Maurer et al., 2013; Sanz & De Lima, 2013).

Yet, the literature also points out the difficulties in operating agent networks. First of all, suppliers and regulators have some difficulty in dealing with *liquidity management* (Cousins & Varshney, 2014; Maurer et al., 2013). Agents are sometimes incapable of managing the necessary asset liquidity that enables them to provide a cash-in and cash-out service to customers (Donovan, 2012; Duncombe & Boateng, 2009), which may result in current customers distrusting the services. Furthermore, human resources management can be problematic in operating these agent networks. Some studies indicate that firms and banks in developing countries find it difficult to recruit qualified employees and agents (Asongu, Anyanwu, & Tchamyu, 2017; Maurer et al., 2013; Potnis, 2014). Because most of them lack the necessary skills and the competence required for handling MFS delivery, they do not understand the operating process of the services and are unable to give appropriate information to their customers.

4.1.2 | Supply: Inter-operability

Research on MFS highlighted that it is important for firms and banks to ensure inter-operability beyond the complex business circumstances of the mobile financial industry (Maurer, 2012; Sanz & De Lima, 2013). Inter-operability of the service enables cross-platform transactions between customers, even though they have accounts with different service providers, and technical platforms such as mobile network operators, banks, networks, and agents (Cousins & Varshney, 2014). For instance, Cousins and Varshney (2014) has pointed out the importance of standardisation within the MFS as a prerequisite to inter-operability (Cousins & Varshney, 2014). However, inter-operability has not yet been properly established

within the mobile financial industry in developing countries (Cousins & Varshney, 2014). If inter-operability is not well-established in the industry, there is a risk of a dominant financial player entrenching a "monopolistic market" (Anderson, 2009; Kadušić, Bojović, & Žgalj, 2011; Maurer, 2012). A monopolistic industry could hamper circumstances in which firms can compete freely.

4.1.3 | Supply: Intentions

Our findings suggest that suppliers' intention to provide MFS is an important aspect of service delivery. Minto-Coy and McNaughton (2016) and Parvin (2013) argued that, in the context of developing countries, banks and mobile network operators generally have a positive view of offering MFS. Most banks in developing countries are trying to adopt mobile banking to satisfy their customers and attract potential ones (Parvin, 2013). Moreover, one article shows that the strong initiative and entrepreneurship of banks and mobile network operators as service providers are closely related to the reasons why some countries have been able to successfully introduce the services (Minto-Coy & McNaughton, 2016) while others have not.

4.1.4 | Demand: Perceptions

The majority of articles under the demand category heavily emphasise the importance of customers' perception of mobile finance services. First, *awareness* means whether a customer is aware of MFS (Hinson, 2011), which can be a major determinant of adoption by micro-finance customers (Ammar & Ahmed, 2016). It can also be a stepping stone to facilitate financial inclusion in developing countries (Ammar & Ahmed, 2016; Peruta, 2018).

Second, *perceived usefulness* relates to whether customers regard MFS as relevant to their everyday activities (Osakwe & Okeke, 2016). According to Mago and Chitokwindo (2014), respondents with a low economic status in Zimbabwe answered that they were willing to adopt mobile banking, based on the perception that it seemed to be easily accessible, convenient, inexpensive, easy to use, and secure.

Third, *perceived risks* are related to the inherent uncertainty of an innovation, which can be identified as a critical barrier to MFS (Bhuvana & Vasantha, 2017; Dzogbenuku, 2013; Kadušić et al., 2011; Mishra & Bisht, 2013; Osakwe & Okeke, 2016). For instance, potential customers would be concerned with the leakage of personal information during the use of MFS (Kadušić et al., 2011), or they may place less trust in the services of mobile network operators and their retailers than in traditional banks, which in turn may decrease their service uptake.

4.1.5 | Demand: Usage patterns

Another significant topic under the demand side of MFS delivery is the usage pattern, particularly relating to domestic money transfers or international remittance (Jones, Williams, & Joshi, 2014; Munyegera & Matsumoto, 2016). In developing countries, remittances from urban areas or overseas constitute an important source of income for family members at home (Jones et al., 2014). To withdraw remittance, recipients usually need to have a bank account with a formal financial institute. However, it can be difficult for low-income people in developing countries to create new bank accounts, as banks often request a higher deposit amount to open an account. In this situation, MFS in developing countries can meet such needs effectively, because they require a much simpler and affordable registration process, as well as offer faster and easier transactions compared with formal financial institutes. Munyegera and Matsumoto (2016) argued that the requirements for the practise of remittance have promoted the use of MFS in developing countries, which has in turn increased the frequency and total value of remittances received, compared with those remittances received via formal banking institutions by households who do not use MFS.

However, the current usage of MFS is largely limited to simple money transactions. Less attention is paid to the adoption of mobile-based savings and loans accounts. Few studies address customers' usage patterns regarding savings and loans in our selected research, reflecting a limited use in practice.

4.2 | Issues on environmental factors

4.2.1 | Regulation

The selected research articles suggest that regulations surrounding the emerging MFS industry should be carefully applied, as they can be a double-edged sword threatening the successful deployment of MFS. Maurer et al. (2013) argued that one of the main reasons behind the failures in MFS adoption is the heavily regulated financial industry. Evans and Pirchio (2014) and Sanz and De Lima (2013) also concluded that there are too many restrictions on MFS, such as agent restrictions and compulsory regulations regarding accurate customer identification, which leads to a rigid business environment. Under those conditions, companies that were initially willing to provide MFS are prohibited from providing MFS by a variety of strict financial regulations, and they may eventually lose the motivation to launch or continue the service.

On the other hand, some studies contend that strict regulations must be retained to mitigate potential risks and protect the security and stability of the financial system (Makulilo, 2015; Vlcek, 2011). The authors argued that appropriate regulations should be implemented to prohibit money laundering and the financing of terrorism, which will thereby sustain a sound financial system (Anong & Kunovskaya, 2013; Cousins & Varshney, 2014). The regulatory environment is in general a decisive factor that either facilitates or hinders the adoption of MFS in developing countries (Evans & Pirchio, 2014).

4.2.2 | Demographic factors

Our findings show that the demographic characteristics of potential consumers in developing countries tend to have a negative impact on the adoption of MFS. To start with, most studies commonly argue that a "lack of income" excludes people from financial services (Alafeef, Singh, & Ahmad, 2012; Ammar & Ahmed, 2016). Unstable and insecure employment is also closely related to the issue of income (Johnson & Arnold, 2012), as is the restricted access to financial services. The literature in this group also argues that low-income populations do not feel the need to use MFS.

Second, limited education is a major obstacle in the diffusion of MFS in developing countries (Alafeef et al., 2012; Ammar & Ahmed, 2016; Dzogbenuku, 2013; Johnson & Arnold, 2012). Not only illiteracy but "financial illiteracy" too is a critical hindrance to financial inclusion. In developing countries, people are usually excluded from the formal financial services even as there is a lack of financial education programmes to educate people (Berger & Nakata, 2013). Conversely, Hinson (2011) suggested a different view and argued that MFS would be a valuable opportunity for the poor, because mobile-based services are easier to use than the formal financial services provided by traditional financial institutions.

Third, regarding gender, the findings from our selected literature are far from conclusive. Some literature works claim that gender discrimination leads to inequality in financial behaviour, which discourages or prohibits women from using the more informal MFS as well as formal financial services (Alafeef et al., 2012; Ammar & Ahmed, 2016; Johnson & Arnold, 2012; Potnis, 2014). On the contrary, Johnson and Arnold (2012) suggested that, in contrast with formal banking services, MFS endow females with increased access to finance due to the simpler registration process and less burdensome documentation requirements.

4.2.3 | Socio-cultural factors

Socio-cultural factors seem to have positive impacts on both the supply and demand sides of the mobile financial industry. Concerning social contexts, Johnson (2016) and Maurer et al. (2013) found a positive impact by social networks, which can increase the usage of MFS due to the effects of personal networking. Moreover, the effects of word-of-mouth could be multiplied, especially in rural areas where people tend to have stronger relationships within their communities. Social networking relationships can also improve the efficiency of distribution channels, because agents' social relationships with customers facilitate the provision of MFS based on trust (Berger & Nakata, 2013; Maurer et al., 2013). Regarding cultural contexts, the articles assert that certain characteristics of local communities significantly influence the adoption of MFS (Alafeef et al., 2012; Potnis, 2014). On the supply side, organisational values and culture affect the supplier's operational transparency and their ability to face market competition. The level of protection for consumers may also influence the adoption rate (Potnis, 2014). On the demand side, however, the effect of cultural contexts on MFS adoption is still unclear and varies in different regions.

4.3 | Issues on impact

4.3.1 | Impacts on financial inclusion

Some articles show that MFS can increase pathways to financial inclusion for low-income populations in developing countries (Hinson, 2011; Maurer, 2012). These services have helped overcome infrastructural constraints and improve financial inclusion (Allen et al., 2014; Hinson, 2011; Maurer, 2012). Asongu et al. (2017) examined the use of mobile devices in African countries and showed that MFS have positive effects on financial depth³ and financial activity.⁴ Yet, there is only one article that empirically examines the effect of MFS on financial inclusion, which makes it difficult to firmly assert the effect of the services. Nonetheless, our findings show that there is a paucity of research addressing how, and to what extent, MFS impact financial inclusion, and to what extent these services have improved the level of financial inclusion.

In addition, many attempts to adopt MFS to improve financial inclusion in developing countries have failed to achieve the expected outcomes, except for a handful of cases in Pakistan, the Philippines and Kenya (Evans & Pirchio, 2014). Mishra and Bisht (2016) shed light on this matter. Out of the 22 countries that attempted to implement MFS, only eight countries managed to create successful MFS that have actually rooted and grown rapidly; three countries showed a slow and limited growth and, in the remaining eight countries, MFS initiatives largely failed to hold.

4.3.2 | Impacts on development

In our selected research, the link between MFS and economic growth is discussed in relation with the increasing coverage of financial services (Kpodar & Andrianavo 2011). For instance, Ghosh (2016) empirically examined the impact of financial inclusion on economic development by analysing data from the Middle East and North African countries. The study demonstrated that a 1% increase in the portion of the population who use mobile devices improves household income by roughly 0.3% points. On the other hand, a similar 1% increase in financial inclusion has doubled the impact on household income. Based on this analysis, Ghosh (2016) concluded that financial inclusion actually contributes to economic development in developing countries. Kikulwe, Fischer, and Qaim (2014) also empirically showed that smallholder farmers who use MFS in the rural areas of Kenya tend to have higher profits than those who do not use the services.

³Financial depth captures the financial sector relative to the economy. It is the size of banks, other financial institutions, and financial markets in a country, taken together and compared to a measure of economic output (Altay & Topcu, 2017).

⁴According to Asongu et al. (2017), financial activity denotes the ability of financial institutions to grant credit to economic operators.

5 | DISCUSSIONS

5.1 | Research landscape

Heeks' (2014) argument of the changing focus of ICT priorities over time explains that, as time goes by, the priority of ICT in development also changes from readiness to impacts. Comparably, drawing from the result of the systematic review, we find a similar pattern of shifting foci at the nexus of MFS, financial inclusion, and development. That is, as the level of MFS initiatives gradually increases, academic attention also moves from the topic of readiness to impact.

Figures 9 and 10 illustrate the allocation of the key issues identified from selected articles based on Heeks (2014, pp.627-628). In our analysis, most of the articles studied the issues related to *readiness*, which indicates "systemic prerequisites" such as ICT infrastructure, skills, and policies (Heeks, 2014). Subjects such as *intention* and *regulation* can be identified as necessary institutional and market precursors of MFS, while *socio-cultural* and *demographic factors* address the demand-side capacities frequently mentioned in the digital and knowledge divide.

The number of articles examining issues pertaining to each domain of *availability*, *uptake*, and *impacts* is not as high as that of *readiness*. In the domain of *availability*, which is the process of implementation and supply of MFS, the articles mainly deal with the issues of *agent network* and *inter-operability*. However, other significant topics regarding the *availability* of MFS, such as product and business design, software applications, or technological issues, have not been addressed in the extant literature.

The domain of *uptake* in our context indicates the processes by which access to MFS is converted into actual usage. *Usage pattern* and *perception* are the issues related to the domain of *uptake* in the existing research. However, as mentioned previously, most of the discussions on usage patterns concern simple money transactions, while there is a lack of analysis on the process of demand-driven service innovation as a means to increase the sustainability and scalability of MFS uptake. In addition, no current research examines actual customers' comments or behaviours regarding MFS—another group of factors affecting the sustainability of MFS usage over time.

In the extant research, key issues pertaining to *impacts* of MFS tend to propose possible or potential impacts, rather than empirically demonstrating or discussing the actual benefits or development impact of MFS.

In sum, reflecting on the result that existing articles mostly concern the stage of *readiness*, we argue that the research on this topic of MFS, financial inclusion, and development still remains in an early stage. Furthermore, there are many research areas in the domains of *availability*, *uptake*, and *impacts* that are not investigated yet.

5.2 | Methods by subjects

At a glance, the articles examining the subjects of supply and demand of MFS delivery use diverse methods across both qualitative and quantitative analyses. However, some tendencies are observed. With only one exception (ie, Chaix & Torre, 2015), the articles examining the supply-side issues use only qualitative methods. Most are based on the discourse analysis using text contents collected from other sources. On the contrary, the articles on demand-side issues adopt mainly quantitative methods, often based on the primary data collected from potential and current customers. Although statistically valid results from quantitative studies can be supplemented by qualitative analyses to be more credible, the demand-side articles tend not to explain the statistical results sufficiently, or contextualise their interpretation in the given research conditions. Thus, the choice of research methods in the extant research shows a limited variety and depth. More quantitative research is needed to accumulate empirical evidence and increase research credibility and generalisability. On the other hand, the articles with less in-depth and contextual examination also need to be researched for more reasonable explanations of the social phenomena.

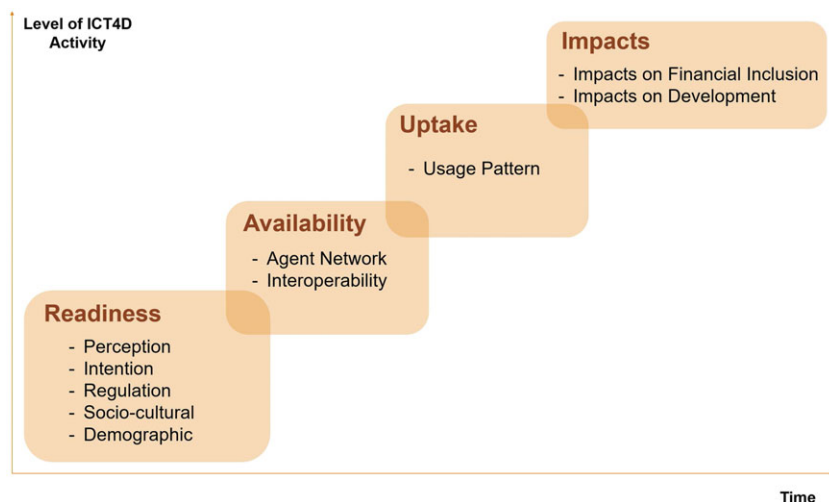


FIGURE 9 Key issues of mobile, financial inclusion, and development based on Heeks (2014)

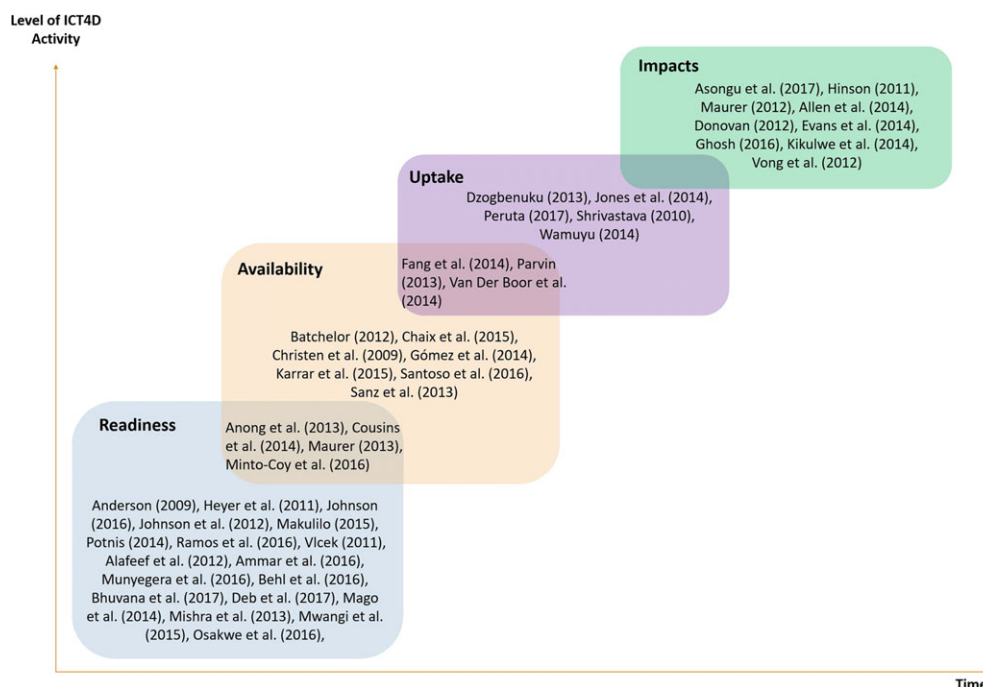


FIGURE 10 Allocation of selected articles by Heeks' theory of "changing focus of ICT4D priorities over time"

6 | CONCLUSION

Responding to the increasing importance of mobile-based financial inclusion initiatives in practice, this study analyses existing academic literature *vis-à-vis* the three themes of MFS, financial inclusion, and development to understand the current research landscape, and identify possible gaps. Using the systematic review, we classify the articles into three main clusters, ie, delivery, environmental factors, and impact, and then analyse the key issues emerging from the current articles: agent network, interoperability, intention, perception, usage pattern, regulation, socio-cultural factors, demographic, impacts on financial inclusion, and economic development.

Our analysis shows that current research on the theme of MFS, financial inclusion, and development is still at the nascent stage. Applying the Heeks (2014) model, we also find that the key topics addressed in the literature tend to mostly deal with the readiness of MFS. By contrast, topics related to the later stages of the MFS value chain, including the availability, uptake, and impacts are only discussed to a limited extent. Further studies are needed to address under-explored issues such as well-organised business models, actual customer demands, and quantitative and qualitative analyses on the benefits and risks of MFS. We also find that the articles on the supply of MFS tend to use qualitative methods, while the demand-side studies are heavily based on quantitative methods. Such a disproportionate adoption of methods should be balanced out with future research, and the application of more innovative or mixed methods is encouraged to deepen our understanding of the topic in the future. These research gaps also suggest implications from the perspective of MFS practice. Further research on ground-level needs and actual usage patterns of potential and current customers may shed light on the development of new business models for MFS providers.

This study is limited by the scope of articles we analysed, which are mainly peer-reviewed academic papers written in English. The choice to leave out policy-oriented reports and grey literature published by active organisations in the MFS field (eg, World Bank, IMF, and CGAP, GSMA, etc.) was intentional, so as to meet our research goal of understanding the academic landscape. Therefore, our results are also limited by this academic constraint.

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APPENDIX A

LIST OF PAPERS REVIEWED

No	Year	Author	Title	Journal	Method	Data source	Region
1	2012	Alafeef et al.	The influence of demographic factors and user interface on mobile banking adoption: A review	Journal of Applied Sciences	Qualitative	Secondary	Jordan
2	2014	Allen et al.	The African financial development and financial inclusion gaps	Journal of African Economies	Quantitative	Secondary	Africa
3	2016	Ammar et al.	Factors influencing Sudanese microfinance intention to adopt mobile banking	Cogent Business and Management	Quantitative	Primary	Sudan
4	2009	Anderson	M-banking in developing markets: Competitive and regulatory implications	Info	Both	Both	Kenya;
5	2013	Anong et al.	Philippines M-finance and consumer redress for the unbanked in South Africa	International Journal of Consumer Studies	Qualitative	Secondary	South Africa
6	2017	Asongu et al.	Technology-driven information sharing and conditional financial development in Africa	Information Technology for Development	Quantitative	Secondary	Africa
7	2012	Batchelor	Changing the financial landscape of Africa: An unusual story of evidence-informed innovation, intentional policy influence, and private sector engagement	IDS Bulletin	Qualitative	Secondary	Kenya
8	2016	Behl et al.	Analysing the barriers towards sustainable financial inclusion using mobile banking in rural India	Indian Journal of Science and Technology	Quantitative	Primary	India
9	2013	Berger et al.	Implementing technologies for financial service innovations in base of the pyramid markets	Journal of Product Innovation Management	Qualitative	Primary	Sub-Saharan African
10	2017	Bhuvana et al.	A structural equation modeling (SEM) approach for mobile banking adoption—A strategy for achieving financial inclusion	Indian Journal of Public Health Research and Development	Quantitative	Primary	India
11	2008	CGAP	Banking services for the isolated and poor	Appropriate Technology	Qualitative	Secondary	Various regions
12	2015	Chaix et al.	The dual role of mobile payment in developing countries	Revue Economique	Quantitative	Secondary	East Africa
13	2009	Christen et al.	It's time to address the microsavings challenge, scalably	Enterprise Development and Microfinance	Qualitative	Individual	Not specified
14	2014	Cousins et al.	The regulatory issues affecting mobile financial systems: Promises, challenges, and a research agenda	Communications of the Association for Information Systems	Qualitative	Secondary	Not specified
15	2017	Deb et al.	Factors impacting the adoption of m-banking: understanding brand India's potential for financial inclusion	Journal of Asia Business Studies	Quantitative	Secondary	India
16	2008	Donner et al.	Mobile banking and economic development: Linking adoption, impact, and use	Asian Journal of Communication	Qualitative	Both	India
17	2012	Donovan	Mobile money, more freedom? The Impact of M-PESA's network power on development as freedom	International Journal of Communication	Qualitative	Secondary	Kenya
18	2009	Duncombe et al.	Mobile phones and financial services in developing countries: A review of concepts, methods, issues, evidence, and future research directions	Third World Quarterly	Qualitative	Secondary	Various regions
19	2013	Dzogbenuku	Banking innovation in Ghana: Insight of students' adoption and diffusion	Journal of Internet Banking and Commerce	Quantitative	Primary	Ghana
20	2014	Evans et al.	An empirical examination of why mobile money schemes ignite in some developing countries but flounder in most	Review of Network Economics	Both	Secondary	Various countries
21	2014	Fang et al.	Exploring the impact of mobile money services on marketing interactions in relation to consumer well-being in subsistence marketplaces—Lessons from rural Cambodia	Journal of Marketing Management	Qualitative	Primary	Cambodia
22	2016	Ghosh	How important is mobile telephony for economic growth? Evidence from MENA countries	Info	Quantitative	Quantitative	Middle East and

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No	Year	Author	Title	Journal	Method	Data source	Region
							North Africa
23	2014	Gómez et al.	Simple mobile banking: Learning from developing countries	International Journal of Business Innovation and Research	Qualitative	Secondary	Kenya
24	2011	Heyer et al.	Fertile grounds for mobile money: Towards a framework for analysing enabling environments	Enterprise Development and Microfinance	Qualitative	Secondary	Kenya
25	2011	Hinson	Banking the poor: The role of mobiles	Journal of Financial Services Marketing	Qualitative	Secondary	Not specified
26	2016	Johnson	Competing visions of financial inclusion in Kenya: The rift revealed by mobile money transfer	Canadian Journal of Development Studies	Both	Primary	Kenya
27	2012	Johnson et al.	Inclusive financial markets: Is transformation under way in Kenya? Development Policy Review, 30	Development Policy Review	Quantitative	Secondary	Kenya
28	2014	Jones et al.	Domestic migration and remittances in India: Rajasthani tribal migrants working in Gujarat	Enterprise Development and Microfinance	Qualitative	Primary	India
29	2011	Kadušić et al.	Consumer adoption—Risk factor of mobile banking services	World Academy of Science	Qualitative	Secondary	Not specified
30	2015	Karrar et al.	Mobile network operators' needs in collaborative mobile money service provision	ARPN Journal of Engineering and Applied Sciences	Qualitative	Primary	Sudan
31	2014	Kikulwe et al.	Mobile money, smallholder farmers, and household welfare in Kenya	Plos One	Quantitative	Primary	Kenya
32	2014	Mago et al.	The impact of mobile banking on financial inclusion in Zimbabwe: A case for Masvingo province	Mediterranean Journal of Social Sciences	Quantitative	Primary	Zimbabwe
33	2015	Makulilo	Privacy in mobile money: Central banks in Africa and their regulatory limits	International Journal of Law and Information Technology	Qualitative	Secondary	Africa
34	2012	Maurer	Mobile money: Communication, consumption, and change in the payments space	Journal of Development Studies	Qualitative	Secondary	Not specified
35	2013	Maurer et al.	"Bridges to cash": Channelling agency in mobile money	Journal of the Royal Anthropological Institute	Qualitative	Secondary	Not specified
36	2016	Minto-Coy et al.	Barriers to entrepreneurship and innovation: An institutional analysis of mobile banking in Jamaica and Kenya	Social and Economic Studies	Qualitative	Secondary	Jamaica and Kenya
37	2013	Mishra et al.	Mobile banking in a developing economy: A customer-centric model for policy formulation	Telecommunications Policy	Quantitative	Primary	India
38	2016	Munyegera et al.	Mobile money, remittances, and household welfare: Panel evidence from rural Uganda	World Development	Quantitative	Secondary	Uganda
39	2015	Mwangi et al.	A decision model of Kenyan SMEs' consumer choice behavior in relation to registration for a mobile banking service: A contextual perspective	Information Technology for Development	Qualitative	Secondary	Kenya
40	2015	Nyandoro et al.	A SWOT analysis of mobile electronic banking: The Zimbabwe case	International Journal of Electronic Finance	Qualitative	Secondary	Zimbabwe
41	2016	Osakwe et al.	Facilitating mCommerce growth in Nigeria through mMoney usage: A preliminary analysis	Interdisciplinary Journal of Information, Knowledge, and Management	Quantitative	Primary	Nigeria
42	2013	Parvin	Mobile banking operation in Bangladesh: Prediction of future	Journal of Internet Banking and Commerce	Both	Both	Bangladesh
43	2018	Peruta	Adoption of mobile money and financial inclusion: A macroeconomic approach through cluster analysis	Economics of Innovation and New Technology	Quantitative	Secondary	Various countries
44	2014	Potnis	Examining mobile banking in developing nations from pro-poor "context, culture, and community" perspective	Proceedings of the ASIST Annual Meeting	Qualitative	Secondary	Various countries
45	2016	Ramos et al.	Protecting mobile money customer funds in civil law jurisdictions	International and Comparative Law Quarterly	Qualitative	Secondary	Not specified
46	2016	Santoso et al.	Islamic microfinance branchless banking model in Indonesia	Intellectual Discourse	Qualitative	Secondary	Indonesia

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No	Year	Author	Title	Journal	Method	Data source	Region
47	2013	Sanz et al.	The uptake of mobile financial services in the Middle East and North Africa region	Enterprise Development and Microfinance	Qualitative	Secondary	Middle East and North Africa
48	2015	Shaikh et al.	Mobile banking adoption: A literature review	Telematics and Informatics	Qualitative	Secondary	Not specified
49	2010	Shrivastava	Build it—Will they come? A study of the adoption of mobile financial services by low income clients in South Africa	Journal of Electronic Commerce in Organizations	Qualitative	Primary	South Africa
50	2017	Sujata et al.	Mobile money: Concept, ecosystem, benefits, and challenges associated with mobile money	International Journal of Applied Business and Economic Research	Qualitative	Secondary	India
51	2014	Van Der Boor et al.	Users as innovators in developing countries: The global sources of innovation and diffusion in mobile banking services	Research Policy	Both	Both	Not specified
52	2011	Vlcek	Global anti-money laundering standards and developing economies: The regulation of mobile money	Development Policy Review	Qualitative	Secondary	Philippines; Kenya
53	2012	Vong et al.	Delivering financial services through mobile phone technology: A pilot study on impact of mobile money service on micro-entrepreneurs in rural Cambodia	International Journal of Information Systems and Change Management	Qualitative	Primary	Cambodia
54	2014	Wamuyu	The role of contextual factors in the uptake and continuance of mobile money usage in Kenya	Electronic Journal of Information Systems in Developing Countries	Both	Primary	Kenya