



Hochschule für
Wirtschaft und Recht Berlin
Berlin School of Economics and Law

Migrant Remittances:

Alternative Money Transfer Channels

Martina Metzger (martina.metzger@hwr-berlin.de), Professor of Monetary Economics, Berlin School of Economics and Law, Institute for International Political Economy Berlin (IPE)

Tim Riedler (riedler.tim@gmail.com), HTW University of Applied Sciences Berlin

Jennifer Pédussel Wu (jennifer.pedussel-wu@hwr-berlin.de), Professor of International Trade and Production, Berlin School of Economics and Law, Institute for International Political Economy Berlin (IPE)

Abstract

This paper first explores the role of digital financial services, e.g. mobile money systems and cryptocurrency-based systems, and their impact on the choice of migrants to send remittances. Secondly we discuss whether alternative remittances sending channels increase access to financial services for remittance-sending and remittance-receiving households. Africa, and in particularly Kenya, are pioneers in alternative money transfer systems and of tailor-made regulatory initiatives to address digital financial services. Thus, our paper focuses on the technologies of the Kenyan mobile money system, M-Pesa, and the major cryptocurrency, Bitcoin, and based on that takes into account selected experiences of other Sub-Saharan African countries. We find that in comparison to traditional remittances sending channels, mobile money transfer channels are often superior in terms of service-related features as costs of transfers for sending and receiving households, speed of delivery, availability and access to the remittances by receiving households or security of transactions. More importantly, mobile cash systems can fulfil the SDG goal of the 3 per cent fee more than 10 years earlier than envisaged in 2030. On the other side, the choice to use a specific transfer channel might be restricted by the lack of physical and technological availability of providers and means, and technological illiteracy. In addition, sending and receiving households might be cautious to use mobile cash systems due to a lack of trust in the system, the providers or regulatory authorities. Accordingly, financial inclusion beyond e-payments and outreach to the poor is not an automatism. In contrast, the use of Bitcoin-based transfer systems is more ambivalent; these systems are technically more challenging both in terms of infrastructure and literacy and more vulnerable to fraud. Some findings also indicate that Bitcoin is an incomplete and inferior substitute to which migrants refer to if their first option is not available or suffers from severe deficiencies. Future research also needs to differentiate sending and receiving households stronger according to personal features in order to deepen our understanding about the choices of and restrictions of vulnerable groups who would benefit the most from using mobile cash systems.

Keywords: Remittances, Financial Inclusion, Bitcoin, Alternative Money, Financial Technology, Africa, Mobile Cash

JEL Classifications F24, G23, G28, O16, O19

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1 Introduction

There is already a vast literature exploring the benefits of a continued stream of economic remittances to migrants' home countries. Two aspects have not yet received sufficient attention. The first is the role digital financial services might play in facilitating remittances transfers by overcoming the deficiencies of traditional formal and informal transfer channels, of which one is the high cost of transfers systematically limiting the development potential of remittances. In 2015, reducing the transfer costs of remittances was included into the Sustainable Development Goals (SDGs) of the UN reflecting the outstanding role remittances could play for development. The subsequent 2016 UN SDG Report shows the worldwide average rate of remittance fees at that time at 7.5 per cent declining from around 10 per cent a few years earlier (United Nations 2016, p. 31). In the first quarter of 2019, average costs for sending US\$200 are still at around 7 per cent, with some African and Pacific islands at about 10 per cent (UN 2019, p. 57). Accordingly, there is still a long way to go to achieve the SDG goal to downsize the costs for remittance transactions to fewer than 3 per cent and to eliminate those remittance corridors that charge more than 5 per cent until 2030 (World Bank Group 2016a, p.1). An increase in the use of digital financial services and crypto currencies has enabled customers to send money around the world quickly at lower fees than with traditional remittance methods. Hence, this paper explores the potential of these alternative money transfer channels to contribute to the premature achievement of SDGs; so we also intend to create and contribute knowledge to the broader discussion of the G20 Global Partnership for Financial Inclusion (GPFI 2017) and the G20 Financial Inclusion Action Plan (FIAP).

A second aspect not broadly absorbed in literature is whether alternative remittances sending channels increase access to financial services for remittance-sending and remittance-receiving households. Although financial technology (Fintech) markets are still small in size, they might offer potential for financial inclusion by reducing transaction costs through the digitalisation of their activities and providing alternative funding to borrowers with limited access to bank credit. This paper will carefully examine these technologies and critically assess their developmental potential. In doing so, this paper also provides an overview of the competition between existing traditional remittance channels and the newly emerged alternative channels.

Remittances are of particular interest in Africa for four reasons. First, many low-income countries in Africa receive a relatively high share of remittances in terms of GDP and per capita incomes. Second, while still a relevant population share is cut-off from traditional financial services, the access to digital services and the coverage with mobile phones is comprehensive in the overwhelming majority of African countries. Third, in some African countries, we find several pioneers of digital financial services. The best known country pioneering digital financial services is Kenya, in which the traditional rift between telecommunication and financial services is largely resolved. Several other countries are also displaying innovative entrepreneurial initiatives making it worthwhile to explore the initiation and obstruction factors in diverse macroeconomic and regulative environments. And finally, transfer costs of remittances both to and within Africa are globally the highest.

This paper is structured as follows. The second section briefly reviews the relevance of remittances, in terms of senders' motives, which provides an indication concerning sending preferences, and compared to other financial flows, illustrating their exceptional economic importance for many developing countries. In section three, we evaluate the existing, traditional, formal and informal remittance channels frequently used by migrants while identifying several obstacles to send and receive remittances, focusing on those service-related features which drive the choice of remittances channels. Section four explains the functioning of mobile cash systems and Bitcoin-based systems which are the most important alternative remittances sending channels. Here the Kenyan market with its well-explored and booming financial technology (Fintech) industry will serve as a reference country for the case studies; we will particularly focus on M-Pesa and its Bitcoin equivalent, Bitpesa.

In addition, we will compare these two digital financial services to traditional, formal and informal, channels on the basis of those features which are most relevant for remittance sending and receiving households and thus explain why certain channels are used, i.e., cost, speed, dissemination and access, reliability, and low risk of loss. In section five, we critically assess the development potential of alternative remittance channels, including their capability to reach out to the poor and to contribute to financial inclusion of low-income households. Chapter six concludes.

2 Relevance of remittances

Economic remittances are defined as the procedure of sending money or goods in any manner to a receiver distant from the sender, either intra-nationally or across borders. The World Bank (2017b) and the IMF (2009) differentiate between three types of personal remittances: compensation of employees; capital transfers between households; and personal transfers. Capital transfers global data availability is very limited and the compensation of employees is a transfer from an employer to its employee, thus not of further interest to us. This paper will therefore focus on remittances sent by migrants working in a foreign country back home to their relatives and friends; these are categorised as personal transfers covering “(...) all current transfers in cash or in kind made or received by resident households to or from non-resident households” (World Bank 2017b, p. 17). This section provides a brief introduction of the relevance of remittances from the perspective of the motivation of an individual sender and in economic terms.

2.1 ... and senders' motives

This section examines four possible motives for remitting income that are often mentioned in the literature. They are not evaluated as to which of them is a more likely and more important driving force to migrate. We rather review these motives in order to explain the use of a particular sending channel and hence to identify, what is important for the sending household, who will also select the channel of transfer according to its own motives and the perception of need on the side of the recipient household. The motives of migrants sending remittances to their home country can vary, since each has a unique story. Finding out what drives migrants to remit has been the purpose of many empirical studies. Altruism in the sense of the selfless support of families and friends in the home country is seen as a leading motive for remittances. This theory is based on the supposition that people have an intrinsic need to support their families and friends. This act of remitting is completely voluntarily (for this passage Piracha, and Saraogi 2011, p.7).

Furthermore, remittances can be seen as a form of insurance for those who stayed home. This so-called insurance payment is a primary focus of remittance researchers. In the literature it is often referred to as a contractual relationship between the sender and receiver of remittances. A quasi insurance payment is made to the family which can counteract a small income and cover actual health or insurance costs of the receiving households. As many of the families in the home countries are dependent on agriculture, remittances can also compensate for crop failures or subsidize the farming activities of the family. The initiator for this kind of dependency can be migrants themselves when they feel responsible for the family which raised them or for their own children and spouse. The migration can also be initiated by the family itself who send their children abroad when they are old enough. The contractual basis of this insurance-like remittance relationship is more figurative and implicit in most of the cases (cf. for this paragraph Piracha and Saraogi 2011, p.10).

The sender of remittances can also pay for services with their remittances. A person who intends to migrate to another country and leaves a house, business or farm behind needs someone to take care

of it during his or her stay abroad. By remitting to a contact person, housekeeper, security guard or employee, the remittance sender is able to take care of his or her belongings back home (Ansala 2012, pp. 17-18). Finally, migrant workers remit in order to invest, e.g. by participations in SMEs, by purchasing land or other real estate. Literature considers a repayment of loans for their own education also as a use of remittances for investment purposes, similarly to the financing of education of the migrant's own children. The real or nominal assets might be owned by the sender or the sender's family (Ansala 2012, pp. 20). These investments can have long-lasting growth and development effects for the receiving households.

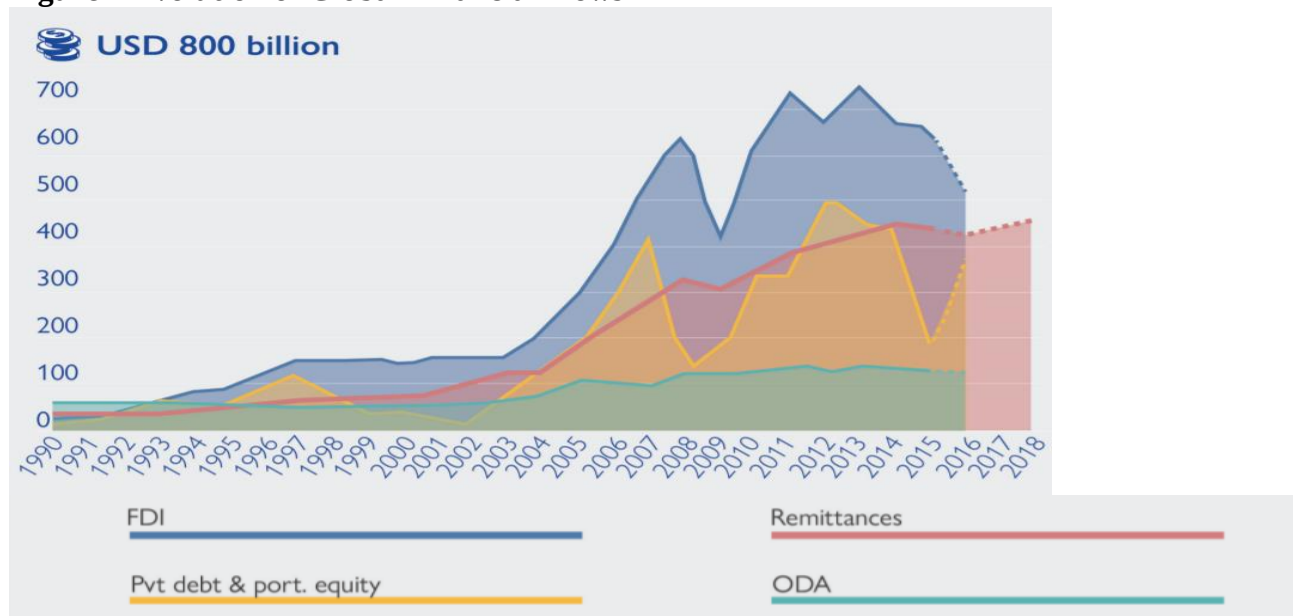
2.2. ... in terms of comparative financial flows

The worldwide monetary flow of international remittances has been rapidly increasing over the last decades. In 1990, approximately US\$29 billion was sent as remittances to developing countries.¹ 10 years later in 2000, the amount already more than doubled to US\$73 billion, followed by another doubling in only five years when international remittances had risen to US\$194 billion in 2005. After only two years of small decline due to the Global Financial Crisis, the remittances flows quickly recovered and rebounded to record levels. Excluding Chinese FDI, the UN SDG Report (2019, p. 57) predicts, that “(r)emittances to low- and middle-income countries are projected to reach US\$550 billion in 2019, making them the largest source of external financing in these countries”. And these are only the recorded remittances which are transferred via formal channels. Estimations suggest that total remittances to these countries, including those sent via informal channels, amount to a multiple of the official figures.

Remittances also grew much faster compared to other financial flows. Figure 1 shows that international remittances are the second largest international monetary flow after Foreign Direct Investment (FDI) and are about four times as high as global official development aid. If Chinese FDI were excluded from the total FDI flows as the UN SDG Report does (2019, p. 58), then international remittances were even higher than the non-Chinese FDI and thus would be the biggest global financial flow (World Bank Group 2019a, p. 1).

¹ If not otherwise noted, data in this subsection comes from World Bank Group (2017b).

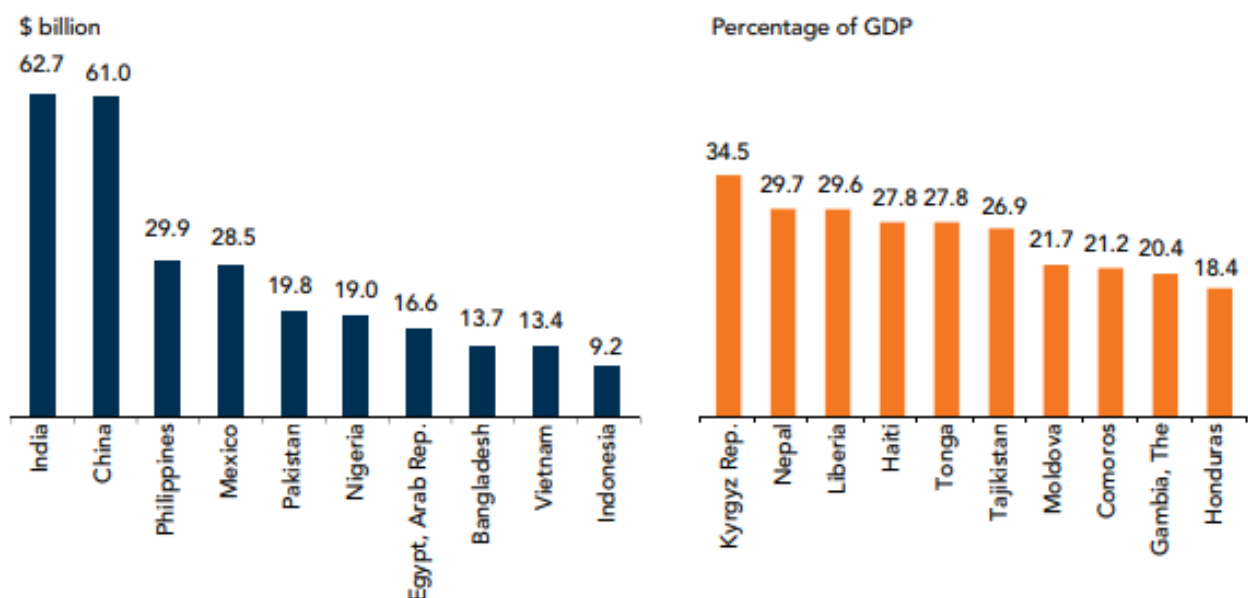
Figure 1 Evolution of Global Financial Flows



Source: World Bank Group (2017b), p. 2.

In absolute terms, high population countries like China, India, and Bangladesh or countries with a large diaspora like the Philippines and Mexico are the main receiving countries (Figure 2). However, in terms of remittances as a percentage of GDP, countries smaller both in population and per capita income belong to the main beneficiaries, e.g. Nepal, Haiti, or Honduras. The latter country group has only marginal access to international capital markets and is restricted in attracting private capital flows in form of FDI or FP when they are not resource-rich. With three quarters of global remittances directed to low- and middle income countries (AFI 2018, p.3) they have a much broader dissemination across low-income countries and a more equal distribution than traditional capital flows, which are highly concentrated in both sending and receiving countries.

Figure 2 Top receiving countries



Source: World Bank Group (2017b); data for 2016.

Moreover, remittances flows are the least volatile and most reliable of all financial flows to developing countries. In contrast to traditional capital flows, which are highly pro-cyclical from the point of view of the receiving countries, remittances show a pronounced counter-cyclical character. The amount of remittances will rise, when there is an economic boom in the sending country resulting in better employment opportunities, including for migrants, and second, when there is a downturn or an outright crisis in the receiving country, i.e., when the need for more financial resources is strongest (Frankel 2010, p. 10). Experience shows that this counter-cyclical behaviour holds true for any kind of crisis, be it due to natural catastrophes (e.g. in Haiti), financial or economic mismanagement (e.g. Zimbabwe), or social and political upheaval. An example is Egypt during the Arab spring when all official subsidies and private capital flows decreased and yet the amount of remittances doubled from US\$7.15 billion in 2009 to US\$14.32 billion in 2011 (Ratha 2013, p. 6).

Gender also plays an important role in remittances flows. Although the majority of migrants are male and despite the gender pay gap, “(a)t the global level, female migrants send approximately the same amount of remittances as male migrants” (International Organization for Migration 2010, p.1). In the economic and sociology literature, the issues women face when sending remittances are often not taken into account. In general, women tend to send remittances to other women who take care of their children, make their education possible, or oversee the housekeeping, while men tend to send remittances to their female family members (usually spouses) who take care of the children (cf. Ibid.). This conforms to classic gender roles. Women remit smaller amounts on average than men and more often remit non-monetary assets e.g., clothes, food and household items (Holst et al. 2010, p. 5). A 2006 study on gender specific determinants in remittances analysed a data set with 3,566 observations (Orozco et al. 2006). The data is based on questionnaires responded to by random remitters in metropolitan areas exclusively interviewed in formal remittance shops in Germany, the UK, and the USA. Receiving regions were South America, Central America, the Caribbean and Africa. On average, the remitters were 36.7 years old and 38.6 per cent of them were women; the remittance sending migrants had an average education in years of 12.35 (Orozco et al. 2006, p. 22). A sample of another study, this time in the Netherlands with 1,680 remittance sending respondents had a share of 53 per cent female remitters; 79 per cent of the 1,680 people received a higher than secondary education (Kosse and Vermeulen 2014, p. 31).

Since the turn of the century there is a vast literature on exploring the benefits of a continued stream of economic remittances to migrants’ home countries (e.g. Ambrosius and Cuecuecha, 2016; Butkus and Matuzeviciute, 2016; Bakker 2015; Aga and Martínez-Peria, 2014; Ratha, 2013; Sirkeci et al., 2012; UNCTAD, 2011; Giuliano and Ruiz-Arranz, 2009; Ekanayake and Halkides, 2008; Rocher and Pelletier, 2008). Economic remittances are a way for migrant workers to provide a livelihood to those who remain in the home country. Hence at an individual household level, remittances strengthen the financial situation of home country recipients and improve their living conditions, *ceteris paribus*. Recipient households have the choice to spend remittances to increase their consumption or to increase their savings, thus accumulating nominal and real wealth; in addition, they might channel remittances towards capacity building and self-financed small investments, increasing their own, and their children’s educational level, creating minimum employment opportunities for themselves. As many studies show, remittances have a positive impact on the general income level of receiving households and their spending power and are thus instrumental in decreasing the risk of sliding into poverty. Overall, economic remittances might be critical for the advancement of the economic and social development of recipient countries. Consequently, from a developmental perspective, it is crucial to facilitate and improve methods to remit.

3 Choice of remittance channels

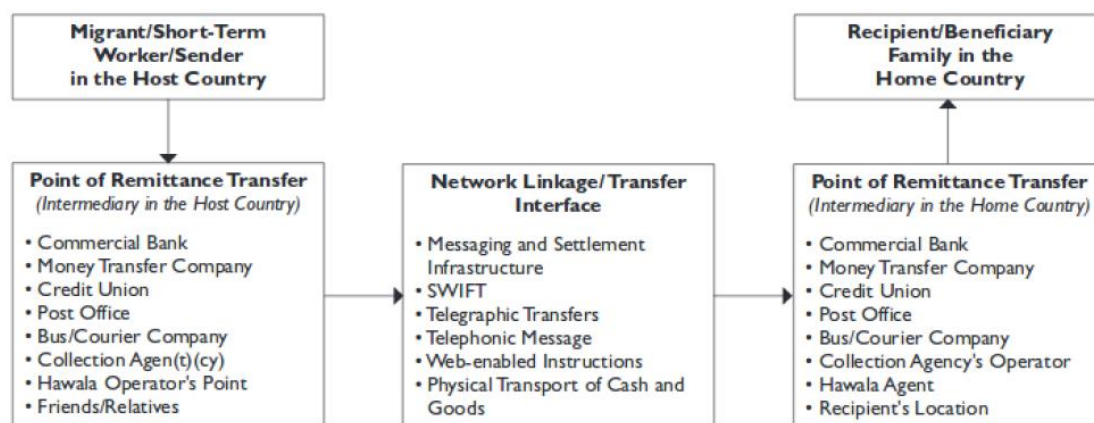
There are three major groups of determinants of migrants' choices of payments channels. Firstly, individual features such as legal status in the host country, gender, age, educational level, general payments habits or financial literacy of the sender or the receiver. Secondly, country-specific features, in particular of the receiving household, e.g., macroeconomic instability and a fragile banking system, capital controls or inconvertibility of the domestic currency in home countries. Finally, service-related features such as costs of transfers for households, speed of delivery, availability and access to the remittances by receiving households or security of transaction.

This chapter² focuses on service-related features driving the individual choices for particular payment channels; the payment channel might not be part of the formal economy, implying informal transactions with risks of fraud for individual migrants and establishing non-official, and sometimes even illegal, economic structures in home countries. The following chapter introduces the transfer channels that are frequently used by migrants for monetary transfers. The single transfer channel's working mechanisms will be shortly explained and evaluated, identifying several obstacles to sending remittances.

3.1 Formal versus informal channels

Transfer channels need a sender in one country and a receiver, usually in another country. Also, an intermediary in both countries is necessary to transfer the money and make it possible to collect or to access. Between both intermediaries, a transfer communication method or so-called interface is used to enable the transfer of the money from point A to point B (International Monetary Fund 2009, p. 4).

Figure 3 The five stations of remittance channels



Note: Not all funds transferred through these channels are remittances.

Source: International Monetary Fund (2009), p.7.

Migrants have many different options for sending money to their country of origin. Figure 3 shows an abstract scheme of five stations which can be applied to nearly all of the transfer channels; common examples for transfer interfaces and intermediaries in both countries are presented. The intermediaries

² Drawing on Riedler (2017).

reach from commercial telecommunication networks, like SWIFT³, to the private physical transport of money.

In general, the transfer channels are classified as informal and formal channels. Formal channels include every officially verified and publicly used monetary transfer service, such as financial institutions like banks, registered Money Transfer Operators (MTOs) and electronic web-based money sending systems. Other ways to send remittances are autonomously managed transfers and informal MTOs with no official transferring registration. These are commonly referred to as informal sending channels (International Monetary Fund 2009, p. 13).

Considering formal payments channels, the most reputable and secure way to transfer money cross-border is via bank transfer. Banks guarantee for the money to arrive at the country cross-border and in many cases, have their own transfer interface, so that transfer failures are extremely unlikely; in the case that they do occur, the customer is reimbursed. Although commercial banks are the most reliable money transfer provider, they do not dominate the remittance market. Commercial banks are an attractive transfer channel, when they have a broad network of branches and/or ATMs in both the sending and the receiving countries. If they cannot offer a widespread access to their services, they risk having other (formal and informal) market participants poaching their customers.

Even if migrants do not use banks as their payment channels, banks are sometimes included in the clearing process of cross-border transacting MTOs, which are financial enterprises that are specialised in remittance transfers and which offer a second formal payment channel. Through this practice, banks are invisibly involved in the MTOs business model and depending on the fees they are able to enforce for balancing the accounts and clearing activities, they profit from the remittance process of MTOs. The biggest MTOs with a total market share of 24 per cent of the formal remittance market are Western Union, MoneyGram and Ria Money Transfer (Plubins 2015, p. 5). The annual increase in remittances also attracts companies from other fields of activities to join in and function as an MTO, for example postal services⁴.

The general input payment for remittances through MTOs is made in cash. There are large MTO-networks with many agents and branches in countries worldwide. Some agents are linked to local convenience stores, post offices or mobile communication shops. Some have their own internal clearing interface and some as mentioned above include a bank's transfer interface. The receiving channel is an agent or branch at a location in the sender's country of origin and the receiving individual is paid out cash again by the agent. One important advantage of MTOs is that their customers need no membership or bank account; together with a higher speed of disbursement and lower fees than those which banks charge, MTOs are highly competitive. Fees tend to be lower because (i) MTOs move a high amount of money transfers and thus dispose over a higher negotiation power vis-à-vis banks than individual migrants with the result that costs for unit sent can be reduced; (ii) MTOs have their network on both ends of sending remittances and thus need to charge the money transfer only once in contrast to remittances sent via the banking sector where in most of the cases two different banks, each at one end of the transfer, charge fees; and finally (iii) MTO customers do not have to be audited as customers of banks.

³ Behind most international money and security transfers is the Society for Worldwide Interbank Financial Telecommunications (SWIFT) system. This vast messaging network is used by most banks and formal financial institutions.

⁴ For African countries see IFAD (2016); for Asian countries see Boon (2017) in the bloc of the Asian Development. See also the Irish An Post and the German Deutsche Postbank which both entered into a co-operation with Western Union.

A third formal payments channel, though still in its infancy,⁵ comprise web-based money sending institutes. The money transaction enabled by mainstream web-based transfer providers happens peer-to-peer⁶, meaning that one device can directly send money to another. The rapid peer-to-peer transfers are usually linked to traditional financial institutions receiving increased attention as they have a better reputation than banks and MTOs when it comes to remittances.

A well-known example for a web-based international money transfer platform is the web application PayPal, which directly recalculates the transferred sum into a foreign currency. In 2015, the PayPal group acquired the company Xoom, which focuses on sending remittances from the United States of America to other countries (PayPal 2016). Apart from Xoom in the USA, for the time being PayPal is nearly non-existent in worldwide remittance competition,⁷ or as Cuevas-Mohr states, “(...) why PayPal, who offers an international personal payments service, has never made a concerted push on the remittance market, is also an intriguing question” (Cuevas-Mohr 2015, p. 12). Finally, since 2018 it is possible to send funds from Paypal to M-Pesa wallets and vice versa, but only if wallet and account run on the same name (Paypal 2019). TransferWise and WorldRemit are the biggest players in the online remittance segment. To date, WorldRemit has generated funding of a total of US\$140 million. Another feature of web-based transfer activity is the ability to send credits to mobile wallets that are connected to mobile cash systems like M-Pesa. In this respect, 100,000 transactions to mobile accounts via WorldRemit are processed every month (Life Sreda 2016, p. 167).

Web-based, licensed applications like Xoom and WorldRemit are considered as formal channels because they are licensed (affiliated) companies and each of their transfers can be tracked and located. The target of every transfer is clear and there cannot be veiled transactions.

There is limited transparency in the informal remittance market and informal transfers are very difficult to track. Thus, informal remittance statistics are based on questionnaires and surveys as a basis for projections, which vary widely depending on the source of estimations and the underlying assumptions. The World Bank Group's suggestions are somewhat in the middle of other assessments and indicate that the informal sector is about half the size of the formal remittance sector in 2006 (World Bank Group 2006, p. 92).

Complex transfer systems such as Hawala in Pakistan, Fei Ch'ein in China, Hundi in India and Padala in the Philippines (El Qorchi, et al. 2003, p.3) also belong to the informal remittance sector; most of these build on traditional banking networks that have existed for thousands of years. These channels play an important role in the remittance industry and are widely accepted and approved of by migrants. Informal networks of numerous agents in several countries generally have their own self-organised clearing system; the only monetary transaction occurs when a cross-border clearing system is used and the balances of both involved agents are compensated. Passwords, codes or official IDs are used for authentication and the entire process is quick and free of regulation. These networks provide anonymity, fast pay-outs, and an absence of third-party intervention.

⁵ A sum of US\$17 billion in peer-to-peer money transactions worldwide is predicted by Forrester Research for the year 2019 (Life Sreda 2016, p. 165).

⁶ Peer-to-peer connection is the direct communication between 2 devices. A mobile phone or PC connects to another device within a network. Both connected devices are equivalent and data can be sent directly.

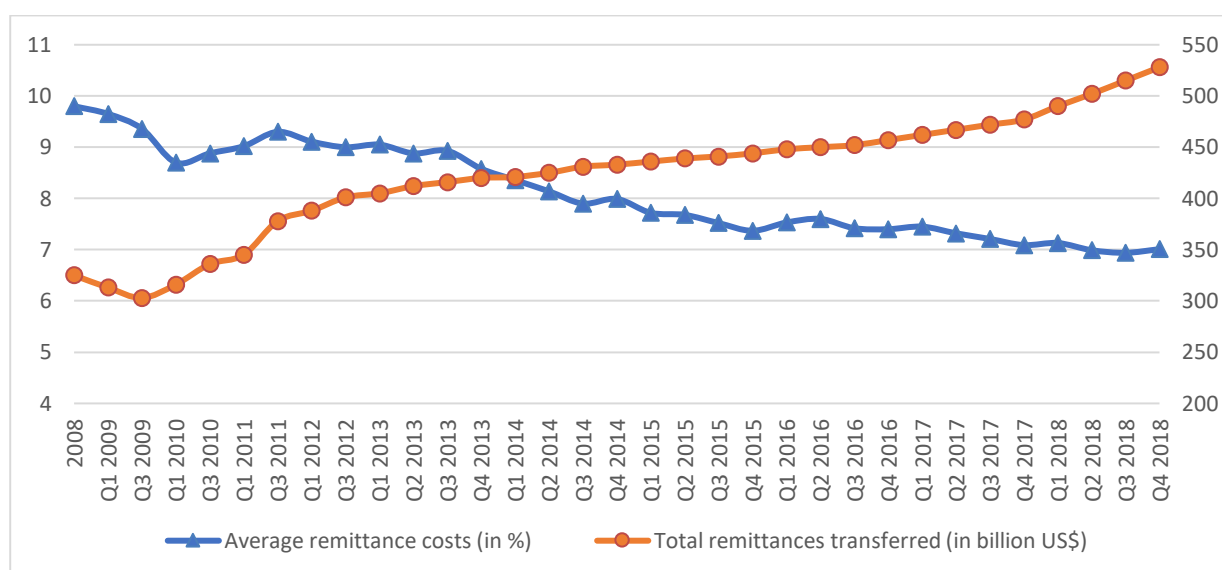
⁷ In 2013 PayPal acquired Venmo, a money transaction platform, which is used for domestic transfers and purchasing goods rather than for remittances.

3.2 Deficiencies of channels

Costs

The cost of remitting money and the level of financial services that are available in participating countries significantly affect remittance levels (Dermine 2016). Although the *average costs* of remittances have decreased by 30 per cent between 2008 and 2016, displayed in Figure 4, costs are still a drag on remittances and are significantly above the UN Sustainable Develop Goal of 3 per cent. The costs are decreasing mainly due to technical innovation which has led more start-ups and companies entering the international transfer market with business models involving transfer platforms. While the average MTO and Bank remittance costs from 2014 until 2017 were static and post office costs increased, overall average costs decreased (World Bank Group 2019b, p. 11) due to newcomers entering the market. The latter usually follow a strategy of low costs to enter the market and offer customers an affordable alternative to bank channels. Still, costs for mobile money remittances increased from 3.73 per cent in 2017 to 4.55 per cent in 2019 (World Bank Group 2019b, p. 13).

Figure 4 Remittances costs and volume (2008-2018)



Sources: World Bank Group (2016a), p. 17, World Bank Group (2016b), p.3; World Bank Group (2019a), p.3; World Bank Group (2019b), p. 14

The costs may vary strongly across the *channels* used and the *regions* to which remittances are sent. Among the three most used, formal, traditional remittance channels, the cheapest is the MTO transfer at 6.3 per cent, followed by post offices with a rate of 6.6 per cent. Banks had the most expensive rates, at 11.2 per cent (World Bank Group 2017a, p. 12).

Globally, South Asia is one of the most cost-effective regions of the world both in terms of receiving and sending remittances, with average transfer costs of around 5.5 per cent (World Bank Group 2016b). This is due to the high share of total remittances channelled to this region; alone China, India, and the Philippines received US\$ 165.8 billion of remittances in 2015 (World Bank Group 2016b, p. 12), which is almost 40 per cent of total remittances worldwide, making the Asian market attractive to all sorts of competitors. In addition, the market entrance of non-bank, innovative providers is easier in Asia than in other regions as a result of the technical affinity broadly observed in Asia.

In contrast, the most expensive region to send money in 2016 was Sub-Saharan Africa, with an average cost of almost 10 per cent (World Bank Group 2016b, p. 1). Two trends are notable: firstly,

the poorest countries in Africa tend to display the highest cost of remittance; and secondly, the transfer costs of intra-regional or intra-continental remittances within Africa and some domestic remittance transfers are even higher than those of remittances sent from outside the continent to Sub-Saharan Africa (IFAD 2009, p. 3).

One reason for the high cost is the low absolute market size; the Sub Saharan African market is growing, but still small in terms of the global market with \$ 43 billion of a total \$ 667 billion transfers in the 2019 forecast (World Bank Group 2018, p.4). A second hurdle is the relatively high share of rural and remote areas which are not comprehensively covered by official remittances channels; hence, outreaching remittances to clients in remote areas comes at some cost. And finally, widespread capital account regulations and existence of administered exchange rate regimes contribute to remittances costs involving a change in currencies.

Even if there is a sizeable amount of remittances sent and a moderate banking infrastructure existing in the receiving countries, costs might still be high. For Lesotho remittances are relatively important in terms of GDP comprising 15 per cent in 2016 (World Bank Group 2018, p.33). If not send informally, including personal cross-border migration, migrants from Lesotho overwhelmingly use South African banks to transfer their remittances as do many other migrants from the region who migrate to South Africa. Accordingly, the South African-SADC remittances channel is quite active (Metzger 2008, p. 3,7ff). However, the costs to remit are considerable; one of the reasons is that the South African banking sector is highly concentrated and thus can afford to charge higher fees. On the other side, as it is fairly present in Lesotho as well as in most of the other SADC countries and furthermore is compliant with national and international banking regulation, the South African banks do not currently have to fear competition from foreign peers or digital financial services.

A survey based on data for migrants living in the Netherlands shows that the larger remittance sums are usually transferred via bank accounts, while migrants rely on other channels, including informal ways, for smaller sums. There seems to be evidence that "(...) the use of informal channels is strongly driven by cost considerations" (Kosse and Vermeulen, 2014, p. 3). The latter is also supported by a World Bank cross-country regression in 2006 showing that in corridors with higher prices and a higher black-market exchange rate, the informal flows are higher and the formal flows are lower (World Bank Group 2006, p. 92).

Since informal transactions are generally opaque, one can only make vague assumptions about their users and the costs associated with these kinds of transactions. It can be suggested that those households which are financially excluded – either involuntary or by choice – will often resort to informal channels due to lack of alternatives. To the best of our knowledge, in term of costs, no actual studies have found evidence as to what factors exactly determine the pricing rates for informal remittance systems. However, we can reliably infer that informal transactions are much cheaper than formal ones, because informal remittance providers do not actually transfer the amount of money cross-border in every transaction but use an individual clearing system. Thus, there are no fees for a banking interface and there is no need of a currency exchange before arrival at the receiver. Further, informal systems do not adhere to government financial market regulations, capital controls, or other foreign exchange rules. Moreover, the avoidance of capital and wealth taxes which senders and receivers might understand as government enforced costs using the formal way, may also be an impetus for using informal channels.

Apart from high costs for remittance products, another problem migrants face is the *uncertainty of* not knowing the *total costs* of a product at all (Holmes et al. 2007, p. 12). Sometimes, there might only been given a range in which the price settles. Also, in low-priced transfer products hidden costs can arise (ibid.). Fees can be subtracted from the remitted sum or marked up upon the remitted sum. Moreover, the fees are in some cases paid as a trade excluded from the actual transfer. Senders have to keep that in mind when they want their counterpart to receive a precise sum.

Other obstacles

One major factor restricting migrants from using a direct remittance payment via a bank or credit institute as an intermediary is the requirement that the sender has to have a bank account in the same bank *and* the receiver has to have a bank account in any bank which would be the addressee of the payment. This locks out migrants without residency papers as customers as they are severely limited in opening bank accounts. Moreover, given the level of *financial exclusion* in developing countries, many receiving households might not have access to the formal banking system. Almost 46 per cent of all adults have an account at a formal financial institution. East Asia and Pacific, which is the most financially-inclusive developing region while only up to 23 per cent of adults in Sub-Saharan Africa, as the most financially-excluded region, have accounts.⁸

The *lack of accurate delivery times* often forces migrants to use other remittance channels with adverse attributes when the sender wants the money to arrive at a certain closing date. This is not valid for the majority of MTOs who are able to tell their clients precisely when the money transfer is going to be completed (Holmes et al. 2007, pp. 16-17). Banks seem to have the most difficulties in defining duration for the money transfer and the transfers to Ghana, Morocco, Serbia and Vietnam in 2007 took longer than the transfer providers had signalled upfront (Holmes et al., 2007, pp. 16-17).

The *security* of international money transfers in the case of remittances defines the concerns of senders that the transferred money could get lost in the intermediary or retained by non-serious providers. Since the major reputation of transfer providers is via word-of-mouth recommendation, the issue of picking an insecure remittance channel is above all faced by new senders and people whose focal point is a low price that trades in reliability and safety (cProfile Business Intelligence Ltd. 2005, p. 21).

A further obstacle for senders in picking an adequate transfer channel can be the limited *availability of physical remittance providers* in their area. When conducting an offline transaction, the sender is forced to remain with banks and MTOs which have branches within a certain radius. "Often these remittances are picked up far from home and families must add substantial travel costs and time to the already high transfer fees" (IFAD 2009, p. 2). In addition, travelling with amounts of cash exposes receiving households to physical assaults and robbery on their way home.

When providers offer their products online, senders can also have problems reaching them in rural areas with poor internet access. The internet penetration in Africa is with 40 per cent very low; only two thirds of the penetration rate compared to the rest of the world and only 12 per cent of the worldwide internet users compared to 17 per cent of global population are located in Africa (Internet World Stats 2019a)⁹. Thus, the lack of technological availability excludes receiving households and therefore also sending households from using online remittance services and exposes them to either the traditional formal channels with high costs, or falling back on informal transfer means. Even if

⁸ The data is of 2014 and refers to adults from an age of 15 years on (World Bank Group, 2017c, table A.1.2).

⁹ IWS uses the following definition for its statistics: Someone is defined as an internet user if he or she has the capacity to use the internet; there are 2 requirements: (1) The person must have available access to an Internet connection point, and (2) The person must have the basic knowledge required to use web technology. All ways to enter the internet are covered by these figures (Internet World Stats, 2019b).

there is internet access, some, especially low-skilled households, lack sufficient technical comprehension to understand how online money transfers work and accordingly use a computer or a smart phone for online remittances (TechnoServe 2016, p. 8). Consequently, it is the combination of costs, speed, and safety which are the driving factors for migrants in choosing their remittances channel, while it is the lack of physical and technological availability of providers and means, financial exclusion, and technological illiteracy which all restrict the choices of migrants from the very beginning.

4 Alternative remittance channels

The above analysed transfer channels have in common that they use the concept of fiat money and different currencies as their functional basis either in cash or as deposit money. Since the 2010s, there has been an intensified search for alternative payment channels in order to reduce costs, facilitate access and lower thresholds for new users. This development has shaped an alternative remittance market with its own channels, still dependent on actual fiat money, however refusing to use real currencies for the actual value transfer process. Two types of these remittance channels will be analysed in this chapter.¹⁰ Section 4.1 deals with mobile cash systems enabling the cashless money transfer via mobile telephones. It focuses on the most reputable player and pioneer in this business field, M-Pesa in Kenya. Subsequently, the Bitcoin-based business models of young companies and start-ups are examined. The focus will be on the start-up Bitpesa, a Bitcoin equivalent to M-Pesa, also located in Kenya. The present use of both channel types in remittances will be evaluated after describing the functional mechanisms. Both types will be compared to the traditional remittance channels concerning transfer fees and practical examples of alternative start-ups will be considered.

4.1 Mobile cash systems

Any type of payment system that allows the user to send money from one mobile device to another is classified as a mobile cash system. There is no internet connection required for the mobile cash system; money is sent using the communications system and net technologies of telecom companies. Besides sending and receiving money, households can use these systems to purchase goods and services.

These mobile cash-only systems entered the African market in the last few years with great success. There are currently more mobile devices than people in the world and as of 2015, there were 5.8 billion people using a mobile device, a penetration rate of 80 per cent (cf. Radicati 2014, p. 2). In Africa the mobile phone penetration increased rapidly with a continental penetration of 67 per cent (Adepetun 2015). Kenya has one of the fastest growing mobile device penetration rates worldwide with a total of over 90 per cent in 2016 (Kemibaro 2016), bringing it into the top position of African countries and far above the global average.¹¹ In the Kenyan market, the mobile communication provider Safaricom is the market leader with a market share of approximately 70 per cent (Kenyan Wall Street 2017).

¹⁰ This chapter draws on Riedler (2017).

¹¹ This figure seems to contradict the figures given for internet penetration in chapter 3.2. With mobile phones access to internet is not always possible. Not every mobile phone is a smart phone and not every smart phone contract covers using the internet. However, there is a positive link between mobile phone penetration and internet penetration i.e. Kenya has an internet penetration rate of 90 per cent (Internet World Stats, 2019b).

In 2007, Safaricom introduced the mobile money transfer and payment system M-Pesa to the Kenyan market. The system exploits the USSD technology for sending financial payments between the cell phones users. The individual current account is saved on the respective user's mobile devices (Jack and Suri 2014, p. 187), thereby the account is “[...] accessible through a SIM card-resident application on the mobile phone” (Mas and Redcliffe 2010, p. 1). Users can withdraw cash via an M-Pesa agent, an extra M-Pesa ATM or a co-operating bank ATM; the fee for the withdrawal depends on the amount paid-out, e.g. the cost for a cash-outflow of US\$200 at an M-Pesa agent equals a pricing rate of about 0.9 per cent (Safaricom 2017a). The customer, however, will be paid out in Kenyan Shilling.

On the other side, each M-Pesa user can approach agents in different stores and buy electronically credited money with their cash (Mas and Redcliffe 2010, p.1). Airtime, as M-Pesa’s virtual money is referred to, is freely transferrable to both users and non-users. Accordingly, even vendors which do not use the M-Pesa payment system themselves accept it for purchasing goods and services in their shops and stores. Another feature which makes the M-Pesa system very attractive for the vendors is that it provides its customers with a kind of overdraft to pay their bills. With that airtime fulfils 2 of the 4 functions of money, i.e. the medium of exchange and a limited medium of deferred payments function. As Hughes and Lonie (2007, p. 68) emphasized, the developers wanted to “[...] allow the customer to make payments as conveniently and simply as they do when they buy an airtime top-up [...].” To raise the acceptance of the M-Pesa payments system, particularly by vendors, the settlement of merchant deposits is automatized as a service by Safaricom, enabling the merchants to settle accounts themselves and receive money almost immediately (Communications Africa 2015).

M-Pesa was launched in Kenya, but quickly spread to Tanzania, Mozambique, the Democratic Republic of Congo, Lesotho, Ghana and Egypt. It also entered the Asian market with India already in 2013 and the European market with Romania (2014) and Albania (2015) (EservGlobal 2016, p. 2). Nevertheless, the major market of M-Pesa is still Kenya; the overall active number of users grew from about one million in 2007 to 33.4 million in 2018 (Medici 2019). Users residing outside of Kenya increased to 13.4 million in 2019 (Alushula 2019).

The fee system of M-Pesa for domestic airtime transactions differentiates between a transfer to M-Pesa users and those to unregistered users.¹² Moreover, the fee charged per transaction depends on the transferred amount with fees per unit declining with increasing amounts. Transfers of 1 to 100 Kenyan Shilling (KSH) are free of charge. To send 101 KSH, which is around one US dollar incurs a cost of 11 per cent of the total sum; fees fall to 0.15 per cent for 70,000 KSH, which is the highest possible amount for one transfer (Safaricom 2019b). The transfer to unregistered persons who are not part of the M-Pesa network follows slightly stricter rules and incurs some higher fee. The possible transfer range starts at 101 KSH and is capped at 35,000 KSH for a fee of 0.87 per cent, due to guidelines of the Kenyan Central Bank. Cross border M-Pesa transactions include fees from 100 to 500 KSH. The maximum amount to be sent is 70,000 KSH (Safaricom 2019a). Should the receiver of a transferred sum of US\$200 from the USA to Kenya want to spend the money in cash, the fees for the transfer and the withdrawal have to be added up. The total amount of 2.65 per cent in fees still undercuts the SDG range of 3 per cent. M-Pesa Global can also be used to transfer funds to bank accounts and over 500,000 Western Union branches (Safaricom 2019a).

M-Pesa has thus already realised the SDG objective of transferring remittances under 3 per cent and is far superior to any other formal channel.¹³ The relatively low transfer fees together with the simple technical handling result in M-Pesa being increasingly used for national and international remittances.

¹² For a discussion of domestic remittances transfers in selected African countries see European Investment Bank (2014).

¹³ The average pricing rate for the same transfer would be at 8.05 per cent, the cheapest alternatives being WorldRemit with a total cost rate of 3.14 per cent, Ria with 5.35 per cent and Western Union with 6.04 per cent (World Bank Group 2017d).

In 2015 Safaricom enabled the international money transfer feature for M-Pesa clients all over the world; a transfer from a bank account to an M-Pesa wallet is possible via USSD code¹⁴ (Safaricom 2017b). In addition, remittance providers have begun to include M-Pesa and other mobile payment systems as a receiving channel in their operating platforms; the best practice example is WorldRemit which allows its clients to send mobile credits to people operating an M-Pesa wallet. WorldRemit is thus now the market leader of transfer applications that enable transactions to mobile wallets, “(...) with 30 services in 20+ countries across Europe, Africa, Asia and the Pacific” (Worldremit 2016). Fees for a WorldRemit-M-Pesa transfer satisfy the SDG threshold for a US\$200 transaction. Moreover, outsiders can charge airtime on Kenyan wallets directly using WorldRemit. A partnership with Western Union enables Kenyan households to receive money via M-Pesa from 45 countries all over the world, including Canada, the UK and the USA (Ntara 2015, p.1). Similarly, Azimo, an online remittance provider from Great Britain announced an 80 per cent growth of transfers to M-Pesa wallets from their platform in 2018 (Mavadiya 2018).

These co-operations link a traditional, formal remittance channel on the sender's side with an alternative, formal remittance channel on the receiver's side. The partnership allows the client to remit directly to a mobile M-Pesa wallet. What can be seen as the greatest advantage of M-Pesa in a remittance context is the fact that the whole transfer and clearing system is organized similarly to the networks of informal transfer channels. Clients can send the airtime freely to friends or family and don't require an agent for the transferring process. The agent is solely functioning as a currency exchange from real currency into airtime and vice versa.

M-Pesa also displays advantages in comparison to informal channels. Every transfer is tracked and verified by secure SMS with single transfers capped at US\$500, thereby limiting the risk of loss and fraud for the overwhelming majority of remittances transfers. The funds of the M-Pesa users are deposited by a trust with commercial banks in Kenya; however, M-Pesa users continue to own their funds at all times. Even in case of bankruptcy, neither Safaricom nor Safaricom's credit would have access to these funds. The Central Bank of Kenya oversees both commercial banks and M-Pesa.

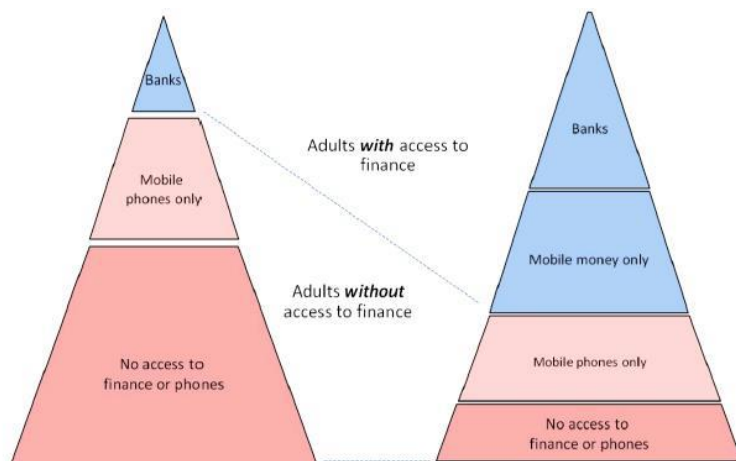
Since there is no real currency involved in the transfer process, the airtime is free floating and the costs and the effort for this kind of transfer are very marginal. In addition, the transfer agent, here Safaricom, is not involved in the transaction process; payments are made by individual users so the only effort made by Safaricom is the clearing process and the customer service.¹⁵ Accordingly, transactions are completed in a short, predictable and reliable amount of time; furthermore, the user is not geographically bound to any (physical or technological) local institution except for the access to a cellular network (Herzog and Bolli 2014, p.4).

There is no doubt that the adaption of M-Pesa as a payment method is a success story in Kenya as is indicated in figure 5, though this refers essentially to domestic transfers. Ntara (2015) surveyed the use of M-Pesa for international transfers. Her study covers transfer data of M-Pesa, nine banks, and Western Union for a period of eight months; it was observed that M-Pesa, with the smallest sum within the observed institutions, has a share of five per cent in this market segment of the 11 biggest players in international transfers in Kenya, however it is still higher than 34 other Kenyan banks (Ntara 2015, p. 77).

Figure 5 Financial access in Kenya

14 Unstructured Supplementary Service Data - Code consistent of numbers, # and * on the mobile keyboard. A certain sequence functions as control command to arrange a bank-to-wallet transfer.

15 Safaricom pays fixed costs for maintaining the cellular network and the variable costs for the secure SMS transfer are negligible indicating that the extra services provided by Safaricom do not have associated additional costs apart from staffing as transfers happen nearly in real-time.



Source: Accenture, 'It's Better Than Cash: Kenya Mobile Money Assessment,' November 2011, cited in European Investment Bank (2014), Annex I-2. Data is for 2006 and 2013.

M-Pesa spreads across the borders to many African countries, but also to Europe and Asia. The business implications of M-Pesa in these other countries are rather small, but it seems that they also have an impact on the local financial markets. However, it is not as engaging as it is in Kenya. For example, 14 months after the introduction of M-Pesa in Kenya there were 2.7 million registered users and 3,000 registered agents; in Tanzania after 14 month there were only 280,000 registered users and 930 registered agents, although Tanzania has more inhabitants than Kenya (International Finance Corporation 2010b, p. 2). In contrast, the case of M-Paisa, which is the name of the client in Afghanistan, commercially launched in 2008, shows that in countries with a highly competitive telecommunication market and low technology adaption there can be many hurdles in setting up a mobile cash system (International Finance Corporation 2010a, pp. 1-3.)

4.2 Bitcoin-based transfer systems

Bitcoin is referred to as cryptocurrency or virtual currency scientifically and in the media.¹⁶ Bitcoin received great attention by the mainstream media because the price occasionally increased to over \$20,000 per Bitcoin and the price has recently shown considerable volatility. Bitcoin is not an actual currency in the classical sense because the four main monetary functions - unit of account, medium of exchange, store of value and medium of deferred payments - are not present.¹⁷ Using Bitcoin as a unit of account is very difficult due to its 8 decimal places and odd pricing numbers. Further, a currency should function as a medium of exchange and should thus be a commonly accepted means and payment method for current transactions; although the number of merchants accepting Bitcoin is increasing, it's still far from crossing a minimum threshold to be of relevance. Lastly, the price volatility and the insecurity about the future performances rules out Bitcoin taking over the function of the store of value and the medium of deferred payments which both require (expected) long-term stability. The volatility and instability of Bitcoin discourages creditors from accepting Bitcoins as a medium to fulfil medium- and long-term contracts, e.g. debt contracts.

There are mainly four ways that Bitcoin remittances can be organized. First, Bitcoin users can privately send Bitcoin from their own wallet to the receiving wallet. All this happens without a remittance service provider and thus the attached safety risks. Another way is to use a service provider that manages the customer's transfer process in Bitcoin. A third alternative is that the service provider collects the customer's real currency, uses Bitcoin as a transfer currency, and pays the receiver in another, or the same real currency. The fourth method is for the provider to use Bitcoin as a settlement currency and abstain from processing every transaction.

The African remittance start-up Bitpesa uses Bitcoin for international money transfers, advantageously connecting both technologies Bitcoin and the already widely accepted and trusted M-Pesa payments system, in the transaction process. To get started with using Bitpesa as a remittance provider, users have to trade their local fiat currency into Bitcoin. They can do so through purchase at one of the numerous Bitcoin exchange online platforms or directly from Bitpesa. Bitbond, a Bitcoin lending platform, has a partnership with Bitpesa, which allows them to quickly access Bitcoin. The Bitcoins can then be sent from over 85 countries in the world to Kenya, Tanzania, Uganda and Nigeria. After receiving the Bitcoin in an African country, Bitpesa converts Bitcoin into the local currency. The receiver can then decide whether the Bitcoins should be paid out in cash or sent to a mobile M-Pesa wallet. For receiving the money as M-Pesa airtime, a second conversion is mandatory and for this Bitpesa charges a consistent fee of 3 per cent per transfer (Maxim 2015) which is on average higher than using M-Pesa without Bitcoin.

One advantage of digital payments which use standard money or virtual currency is that the receiver has the opportunity to make their payments fully digital. There is subsequently no need to collect money from an agent. More people in rural Africa then have the chance to receive their remittances via mobile phone and can also process their transactions directly without contacting an agent (only for in-payments). Therefore, travel from distant rural areas to the agent destination need not be undertaken and the risk of getting robbed while carrying a lot of paper cash is reduced to zero. When no paying-out agent is involved, the cash also can't be collected by third parties. Unbanked people have more opportunities to send and receive money besides MTOs and informal channels. Bitcoin wallets can be created easily online and be accessed directly via mobile phones. The Bitcoin wallet complies with a banking account without accounting fees and small transaction fees (Krause 2016, p. 22). This also applies to M-Pesa, while their service is locally limited and Bitcoin is tradable

16 A technical explanation of the Bitcoin functional mechanisms can be found in the Bitcoin introduction paper by Satoshi Nakamoto (2008).

17 See also Lo and Wang (2014) in particular pp. 3-12 on Bitcoin's unsustainability. As a reason why it is unfavourable to adapt see <https://www.economist.com/the-economist-explains/2018/07/09/why-bitcoin-uses-so-much-energy>.

worldwide (Ibid.). In this way undocumented migrants have access to the financial system. However, WiFi and internet penetration still limit sending Bitcoin remittances, since every transaction has to be made online.

Bitcoin presents the possibility of creating a linkage between the pay-out and the spending purpose. If a remittance sender wants to ensure that the money they sent is exclusively used in a certain disposition, for example their child's education, this can be attained via blockchain based smart contracts¹⁸. For instance, education fees in Kenya can also directly be paid via M-Pesa (Vodacom 2017). The intermediary role played by the family in Kenya paying the educational fees is thus avoided. Smart contracts can be set up between two partners and are monitored and completed independently; if a certain condition is fulfilled, the digital money gets paid out.

One strength of Bitcoin in the remittance context is its potential, and already established use, as an intermediary currency and as a settlement currency. The advantages of a Bitcoin transaction being complete in about ten minutes and the very small transfer fee qualify Bitcoin to work as an intermediary between fiat currencies. Bitcoin can serve as the settlement currency, because even if the settlement sum is high, there is no effect on the cost, since the transfer fees are calculated by file size and not by the value transferred (Caffyn 2015). Furthermore, a fee can be added voluntarily, if the sender wants to incentivize completing their transfer faster. However, a liquid market must exist and Bitcoin should be attainable and resalable in a short period of time for a relatively stable price (Scott 2016, p. 5).

Altogether the higher fees and the volatility of the Bitcoin value together with the technological requirements, which in many rural areas are only marginally existent, and the technological knowledge necessary to manage secure Bitcoin transfers, are obstacles to wider use in African countries. In addition, Bitcoin exchanges are prone to several forms of fraud and cyberattacks in which course the exchanges either were shut down or even disappeared completely like Kipotchi (see below) with the result that the deposits were gone (Carlisle 2017, p. 19). Hence, it is not surprising that the market share of Bitcoin-based services to transfer remittances is relatively limited. Today, Bitpesa is still preferred for international business transactions due to its convertibility and reduced foreign exchange costs. In addition, it is appreciated by specialised African innovators and computer experts.

Scott (2016, p. 5) reports in his paper on social finance through cryptocurrencies, that “(...) *Bitcoin also has potential to facilitate small-scale international commerce. Local merchants in poorer countries may struggle to access international payments systems to sell their goods abroad. For example, a rural crafts cooperative from Zimbabwe might struggle to set up a website with an integrated credit card payments system, but getting a Bitcoin address might enable them to sell products in exchange for Bitcoin tokens, thereby avoiding traditional e-commerce systems (which often involve having to set up a merchant account with a formal bank). Provided that a market exists to exchange such Bitcoins received in trade back into a usable local currency, this could prove useful. For example, imagine a scenario where a small-scale independent producer of sustainable cocoa butter products sold them to US clients in exchange for Bitcoin tokens that were then redeemed for local - or foreign - currency on a Bitcoin exchange. Likewise, a small-scale non-governmental organization can easily set up to receive Bitcoin tokens as donations*”.

Another Fintech start-up in Kenya was Kipochi, which, just like Bitpesa, was founded in 2013. It was a platform also directly connected to M-Pesa. Kipochi adapted the M-Pesa wallet service and made it possible for customers to buy and sell Bitcoin via SMS. A conversion in local currency was not necessary at any point. Under unclear circumstances Kipochi disappeared in 2014 without a trace (for

¹⁸ Smart contracts can be set up between two partners and are monitored and accomplished by themselves. That means that if a certain condition is fulfilled the digital money gets paid out.

this passage Buenaventura, p. 29). In 2016, Pelle Braendgaard, the founder of Kipochi wrote about the disappearance in his financial blog, StakeVentures. According to Braendgaard a couple of weeks after the M-Pesa integration, the M-Pesa-Kipochi connection was shut down by the merchant provider Kopo Kopo which was responsible for the operation of the M-Pesa-Kipochi connection. This raised the interest of the Central Bank of Kenya, which allowed Kipochi to continue its business only if it would be co-operating with a telecom provider or financial institution (for this passage Buenaventura, p. 29) which are both supervised and monitored. This example shows that it is essential to place money transfer systems – with or without resorting to Bitcoins - under strict and thorough scrutiny which raises regulatory and government issues for the time being not addressed.

To respond to the competitive disadvantage of higher fees for Bitcoin transfers, the company OKLink, which is a subsidiary of OKCoin from Hong Kong and a settlement network for Bitcoin remittance platforms, announced in 2016 that they will take over the transfer costs for international Bitcoin transfers by their customers of accumulated amounts up to US\$100,000. The costs will be balanced for every transaction of under US\$500, so that particularly senders of small sums will be supported. Bitpesa is involved in the settlement network and the subsidizing deal, however not as the only player in the Bitcoin remittance market. For instance, Coins.ph, Rebit or Coinplug are also take a share in the settlement. With that the costs for Bitcoin remittances will be reduced to a range between 0.6 to 1.6 per cent, meaning Bitcoin-based remittance transfers will not only be well below the costs of traditional remittance channels, but are able to compete with mobile cash systems (for this para Bergmann 2016).

5 Preliminary assessments of alternative money transfer channels

While there are numerous studies, surveys and research papers on the evolution of remittances, very few contributions evaluate (i) to what extent and why households use alternative remittance channels like mobile cash systems and Bitcoin-based transfer systems; (ii) what exactly is the developmental potential of alternative remittance channels in terms of overcoming obstacles of traditional sending channels, outreach to low-income households and financial inclusion; and finally (iii) what characterises their relationship to the traditional financial sector. Given the limited studies available addressing the intersection of digital financial services, remittances and development, we will offer only a preliminary assessment of the developmental impacts of the use of alternative money transfer channels for sending and receiving remittances. We first offer overview a portion of the current remittance transfer market in order to assess the share of alternative remittances channels and its prospect.

5.1 Dynamics of the market

The amount of online cross-border remittances transactions increased by more than 80 per cent from 2011 (US\$21.3 billion) to 2015 (US\$38.5 billion) and by another 100 per cent for the next 4 years to US\$79.3 billion (Statista 2019, 2017), though from a low level of around five per cent of total international remittances (Sreda Life, 2016, p. 166). Statista (2019) predict that the growth of digital remittances will continue to be two-digit for at least the next 5 years (Statista 2019) Mobile money has meanwhile 690 million registered customer accounts across more than 90 countries (GSMA 2017b), serving 184 remittances corridors, including seven fragile countries in Sub-Saharan Africa (GSMA 2018, p. 3). This provides an idea of how vibrant the online payment market is and how many people are shifting to make payments and transactions online. There is thus the probability of remittances being increasingly processed online in the next years.

Mobile cash systems and cryptocurrency-based models with digital money that can be used for direct payments are able to compete with other remittance-transferring entities, e.g. banks, MTOs or informal channels, including the physical transport of money. Many of the Bitcoin remittance start-ups are targeting numerous corridors at once and also providing an alternative receiving channel besides banks. Alternative remittance sending channels challenge other remittances transfer systems from different angles such as the *cost of processing the transfer* and the *cost of maintenance of the transfer network* as well as *speed of transaction and clearing*.

This new global competition initiated by start-ups tackles the average *transfer price for remittance* in all remittance channels as they cover all and keep expanding their sending and receiving destinations. Mobile operators offer a pricing rate of 2.87 per cent on average making them more than half as expensive as their nearest competitors (World Bank Group 2017a, p. 12). Especially in the high price Kenyan market, where some remitters have to pay fees of 17 per cent the fixed price rate of 3 per cent of BitPesa and low-priced transfers via M-Pesa make a real difference (Heuler 2015). All in all, there is a huge opportunity for new companies, new technologies and new business models inventing new and expanding existing digital financial services with the financial service market locally and globally being in a transition with new players entering.

Nearly all remittance Bitcoin start-ups and M-Pesa use a *clearing and settlement system* with local pay-out channels. This makes them superior to banks and competitive against MTOs and informal remittance providers that use similar systems, whereas the MTO system is much more complicated, inefficient and dependent on banks. M-Pesa transactions are processed in almost real time, which means that when the SMS is sent and received the receiver has the funds and can access the money immediately and pay at shops that accept M-Pesa via mobile payment. A direct Bitcoin transfer peer-to-peer takes no longer than 10 minutes until the transfer is verified. Bitcoin remittance services take a little longer depending on the pay-in method and how many times the money must be converted into other currencies. This relatively *fast speed of alternative channels* is helpful for migrants with a short time preference. If they send money spontaneously, alternative channels and informal channels should be their method of choice. Also, if there was an incident back home and the money is needed immediately, migrants can depend on these types of payment. Bitcoin is open source and can easily be adapted by start-ups and emerging small businesses. Bitcoin and M-Pesa constitute a serious threat for both informal and formal remittance channels in pricing and transaction speed; accordingly, these alternative channels have the chance to attract customers who normally rely on informality.

Because Bitcoin-based systems and M-Pesa are superior in *cost and speed of remittances transfer* as well as *low costs of maintenance due to their leveraging of existing networks* they influence market prices for sending remittances resulting in decreasing average costs of remittance transfers. Competition is the main factor for the 2.5 per cent decrease of remittance costs between 2008 and 2016 (World Bank Group 2019a, p. 5). As the study “What explains the cost of remittances?” found

out the more competition among providers in remittance corridors persists, the lower the transaction costs tend to be (Beck and Pería 2009, p. 120). Moreover, “(...) the average prices of remittances are significantly lower in corridors with a higher number of migrants, smaller share of rural population, and a common language” (Beck and Pería 2009, p. 120). Conversely, there are certain sending corridors without real competition to rural areas in Africa where only MTOs will offer their service of transferring and accordingly charge high fees. The strong competition by alternative channels puts in particularly pressure on traditional financial intermediaries which dispose over a *banking network with branches* which need to be maintained and determine a lower bound under which their transfer costs cannot sink without *compromising the network and their financial resilience*. One way to cope with this competition is to improve bank-to-mobile interoperability (GSMA 2017b) or to enter this market with an own digital financial service vehicle in order to internalise the technological benefits; traditional companies like Western Union and Money Gram have done so and launched their online money transfer clients by now.

Though, M-Pesa and Bitcoin are regulated, conditions vary depending on the country. M-Pesa has a maximum limit of airtime that can be transferred with one transaction. In contrast, the amount of Bitcoin that can be transferred within one transaction is not capped. Besides the regulatory issues for fiat money remittances, there is a next tier included when Bitcoin is regulated, too. Many countries and organisations recognise Bitcoin, but show many diverse ways to approach it. Certain laws could exacerbate activities by Bitcoin remittances companies if there is no international level playing field as for instance in anti-money laundering rules and laws, but rather specific Bitcoin regulations, which differ from country to country.

5.2 Overcoming obstacles

Mobile cash systems do suspend critical restrictions under which other formal channels suffer, for instance from the lack of physical and technological methods and providers, financial exclusion, and a limited technological understanding. These restrictions might still exist; however, they no longer have an effect on the choice of the chosen sending and receiving channel. The only restrictions for remittances transfers via mobile cash systems are the use of a SIM card and the operation of a cellular system. Thus, mobile cash systems empower migrants to choose the remittance channel according their own preferences and needs and, in so doing, involve developmental potential far beyond its economic advantages.

According to many surveys and case studies, these preferences and needs belong a short, predictable and reliable amount of time for the transfer and protection against loss and fraud. However, the major impact of mobile cash systems consists of the enduring and sustainable cost-slashing of the remittances transfer. The SDG objective of fees of fewer than 3 per cent per transaction is envisaged globally for 2030, but cash mobile systems enable it already today for many of the existing country corridors (GSMA 2017c, p. 9).

Most of these benefits also apply to Bitcoin-based transfer systems; these systems are challenging for households and impossible to handle for those who are technically illiterate. In addition, other cryptocurrencies than Bitcoin are often not viable; it is very difficult to project which of the numerous crypto currencies invented each year will have a lasting effect and which ones will level out and cease to exist during the next years. However, a Bitcoin-based stand-alone system might be difficult to establish as a major remittances channel due to the above mentioned limitations as well as its vulnerability to fraud. Therefore, Bitcoin-based transfer systems have strived to advance co-operations with mobile cash systems in order to respond to these concerns and to offer their customers the advantages of both systems.

There is one basic motivation when customers prefer to use Bitcoin-based transfer systems, even if they do not operate a co-operation with mobile cash systems; customers apprehend Bitcoins as an insurance either against a perceived predatory state threatening to limit the disposal over and the amount of transferred money by capital controls and tax claims, or against macroeconomic instability in the receiving country. A recent study (Krause 2016) about the determinants of Bitcoin usage for remittances in a sample with 21 countries showed that the demand for Bitcoin is positively correlated to inflation and financial regulation and negatively correlated with financial openness. The study uses explanatory variables such as “(...) multiple exchange rates, restrictions on current account transactions, and the requirement of surrender of export proceeds” (Krause 2016, p.25). The response and behaviour displayed in the study is similar to that observed in circumstances of currency substitution or dollarisation in highly unstable economic or political environments.

Another insight of Krause (2016) is that while, unsurprisingly, the usage of Bitcoin is positively correlated with internet penetration rates, it is negatively correlated with financial inclusion in terms of access to a bank account. On first sight this contradicts the evaluations of many observers that the use of digital financial services increases financial inclusion. If the results of this study were to be generalised, then this would again indicate that the usage of Bitcoin is an incomplete *and* inferior substitute to which customers refer *only* if their first option suffers from deficiencies or is unavailable.

Finally, M-Pesa and Bitcoin are not (yet) subject to capital controls, although sending and receiving money constitutes a nominal asset with which the receiver might settle liabilities. Accordingly, financial or governmental institutions are not allowed to freeze or hold back parts of the amount transferred. The airtime movement of M-Pesa can still be tracked, whereas Bitcoin sending and receiving locations are not visible, only the remitted amount, providing users with more possibilities to anonymously send remittances.

5.3 Financial Inclusion

The analysis focused on Kenya; however, in many high-remittances receiving African countries there are already alternative banking structures evolving in the form of technological start-ups and young companies that offer non-traditional banking services such as virtual payments and low-cost money transfers. While still a relevant share of population is cut-off from traditional financial services, the access to digital services and the coverage with mobile phones (and to a lesser extent internet availability) is in the overwhelming majority of African countries comprehensive. Hence, digital financial services, including blockchain technology and the use of cryptocurrencies, seems to offer cost-cutting and broadly disseminated services to remittances receiving households so far excluded from traditional financial markets. In that context, mobile money in particular and digital financial services in general might provide a “gateway to financial inclusion for both remittance senders and recipients, allowing them to join the digital financial ecosystem and to access a broad range of digital financial services beyond remittances, such as storing money in a secured account or performing digital payments” (GSMA 2016, p.5).

This argument derives increased financial inclusion from the technical availability of mobile cash systems or digital financial services to underbanked households. While the deducted positive impact on financial inclusion relies on the acceptance of these services by potential clients, consumer acceptance is not automatic. Many studies which give evidence for a positive impact of digital financial services, through facilitating remittances and hence financial inclusion, indicate that consumer protection and a regulatory environment perceived as supportive are decisive for consumer adoption (Biggs 2016). For targeting vulnerable and disadvantaged households like women, a recent UN Capital Development Fund study (2017) shows the creation of specific tailor-made products and services might additionally be required to fit better to the needs of these groups.

In most of the available studies analysing effects of mobile cash systems or the usage of cryptocurrencies on financial inclusion, digital financial inclusion is understood as sending or receiving money and performing purchases or sales. In that respect, financial inclusion increases with the dissemination of the technology and the rise in market shares by mobile-cash or cryptocurrency-based systems. However, it is unclear how far digital financial services actually induce financial inclusion beyond e-payments. Empirical evidence is at best mixed and some experience is less encouraging in that respect. A study classifying three groups in Kenya (having no access to a SIM card, having access to a SIM, but do not have an M-PESA account, having an M-Pesa account, but not saving on it) shows that digital financial services do not necessarily result in a rise in financial inclusion beyond the use of payment services. Those households who would be technically, and in terms of income, able to save (phone owner and higher educated), are less likely to do so in comparison to other groups (rather poor, less educated and female households) (van Hove and Dubus 2019). Alternatively, in Ghana, savings by users of mobile cash systems are facilitated; the mandatory regulation requires mobile money providers to deposit the float money on interest-bearing accounts with formal banking institutes and pass on 90 percent of the interest earned (Bank of Ghana 2019; Wolf 2019). It remains to be seen whether the steps taken by regulatory authorities in Ghana result in an increased amount of savings or a change in saving behaviour.

5.4 Reaching out to the poor

Without these alternative channels, poorer and financially excluded households, in particular those in rural areas, are at the mercy of informal providers of remittances services with all the downsides of this form of business, e.g. high costs, uncertain delivery time, and limited rights to prosecute the agent or the individual in case of loss or fraud. For these households at the lower end of the income spectrum, which are overwhelmingly women, no alternative exists in contrast to those financially included households, who still have the possibility of transferring remittances via banks. In addition, poorer households on average remit and receive smaller amounts and with a higher frequency; thus, these households benefit from the cost reduction offered by alternative channels relatively more than households who can afford to remit and receive higher sums once in a while. This assessment is supported by the latest data on amounts remitted across borders via mobile cash systems; households using mobile money remit on average only US\$82, while the average amount transferred across all channels adds up to US\$500 (GSMA 2017a, p. 10).

The positive distributional effects of cost-cutting and broadly disseminated alternative channels on poorer households might be even more evident for domestic money transfers and especially domestic remittances. At the beginning, more than 90 per cent of the remittances received via M-Pesa in Kenya were domestic transfers from urban to rural areas (Ntara 2015, p. 73). In that way rural households may also participate in the economic advancement which is often concentrated in industrial and service clusters mainly in urban agglomerations. Using panel data, similar results could be shown for households in rural Uganda; mobile money access had a positive and significant effect on household welfare measured by real per capita consumption due to a decline in transaction costs and the time taken for money transfers to reach remote areas (Munyegera and Matsumoto 2016, p. 127). Similarly, Reeves (2017) shows for 18 countries in Sub-Saharan Africa that given a certain level of technological infrastructure and the use of cryptocurrencies, there is a positive correlation between remittance transfers and poverty reduction. Should these effects be generally noticeable and significant, then alternative remittances channels would enable trickle-down effects and thereby might set disincentives for a further rural exodus.

However, not all case studies result in such positive evaluation. For sending and receiving households the technical requirements might prove to be too challenging and their commitment to traditional

functional transfer methods too persistent. Individuals, especially those with a lower education level, tend to stick with processes they know and trust. Although not related to remittances, a study of rural Benin could not show that one mobile cash system in partnership with a single public high school would facilitate school fee payments and thus the hoped-for improved enrolment failed to appear. School fees were and still are an impediment to enrolment and “(...) students often depend on extended family and kinship networks to pay fees” (Adida et al. 2018, p. 1). Parents would not adapt to the new money transfer system even though other payment options were costly and risky in terms of loss and of passing payment deadlines (Adida et al. 2018).

The lack of technological knowledge of senders of remittances, especially among older receivers, is a problem that importantly affects the spread of alternative channels. Consequently, it is difficult to assess the extent that alternative remittances channels actually pull sending and receiving households out of informality. While appreciating all the positive effects alternative transmission channels have on poorer households, they are not a panacea, or as the CEO of a leading US think tank on financial inclusion put it: “It is important for the development community to pause and reflect on how our work fits into this fast-moving new universe. Poor people remain central to the story but are to lose sight of in the excitement around technology and innovation” (Bull 2019). Hence, realistic expectations concerning the performance and creation of the expertise required to tap the full potential of both remittances and alternative transfer channels are of crucial importance.

6 Conclusions

Mobile cash systems and crypto currency-based models are one segment of digital financial services, only some of which is concerned with remittances transfers; however, both the wider Fintech market and the more restricted segment of alternative remittances transfer channels are highly dynamic and in permanent transition. New players with the latest innovative products and services enter the market, cooperating and establishing partnerships across industry branches, thereby challenging both traditional rivals and regulatory authorities. In comparison to traditional remittances sending channels, mobile money transfer channels are often superior in terms of service-related features as costs of transfers for sending and receiving households, speed of delivery, availability and access to the remittances by receiving households or security of transactions. Furthermore, they are increasingly used for all sorts of payments, including remittances transfers. Most important, mobile cash systems can fulfil the SDG goal of the 3 per cent fee more than 10 years earlier than envisaged in 2030.

The choice of migrants and their families in the home countries to use a specific transfer channel might be restricted by the lack of physical and technological availability of providers and means, and technological illiteracy. Some studies emphasize that even if physical and technological availability is ensured and enough literacy is given, households might be cautious to use mobile cash systems due to a lack of trust in the system, the providers or regulatory authorities. So, financial inclusion and outreach to the poor is not an automatism, but requires an enabling and resilient environment. These findings cannot be generalised, yet; though, they suggest undertaking more comparative studies in order to gain a deeper understanding about the choice of the remittances transfer channels by sending and receiving households and the influence of regulatory and macroeconomic environment on these decisions. Research to come also needs to differentiate sending and receiving households stronger according to personal features like gender, educational level, age and place of residence (urban/rural). Research contributions could then make allowances for vulnerable groups who would benefit the most from using mobile cash systems.

Conversely, the use of Bitcoin-based transfer systems is more ambivalent; these systems are technically more challenging both in terms of infrastructure and literacy and more vulnerable to fraud. Some findings have also indicated that Bitcoin is an incomplete and inferior substitute to which migrants refer to only when their first option is not available or suffers from severe deficiencies.

Though our findings are strongly biased by the case study of Kenya with M-Pesa and Bitpesa and by Sub-Saharan Africa in a broader sense, we are convinced that experience gained in Africa holds keen insights and findings for other regions as this region has pioneered alternative money transfer systems and tailor-made regulatory initiatives to address digital financial services, of which neither have been thoroughly reflected and reviewed outside Africa, yet.

References

- Adida, C., Chabi Bouko, A., Verink, A., Chockalingam, G. & Burney, J. (2018). Pilot of a mobile money school fee payment system in rural Benin, *PLoS ONE*, 13(6): e0198240.
- Aga, G. A. & Martinez Peria, S. M. (2014). International remittances and financial inclusion in Sub-Saharan Africa. *Policy Research Working Paper No. 6991*. Washington D.C.: World Bank.
- Alliance for Financial Inclusion (AFI) (2018). Innovative cross-border remittance services: Experiences from AFI member countries, *Guideline Note No. 30*. Kuala Lumpur: AFI.
- Ambrosius, C. & Cuenquecha, A. (2016). Remittances and the use of formal and informal financial services, *World Development*, 77: 80-98.
- An analysis of the informal Hawala system. *A Joint IMF - World Bank Occasional Paper 222*, Washington D.C.: IMF.
- Ansala, L. (2012). *Motives, channels and migration for remittances: Evidence from Uganda, Senegal and Nigeria*. Master's Thesis. Department of Economics, Aalto University School of Economics
- Bakker, M. (2015). *Migrating into financial markets: How remittances became a development Tool*. Oakland: University of California Press,
- Bank of Ghana (2019). Payment System and Services Act, Act No. 897. Available at: <https://www.bog.gov.gh/wp-content/uploads/2019/08/Payment-Systems-and-Services-Act-2019-Act-987-.pdf> Accessed:10 September 2019
- Beck, T. & Peria, M. (2009). What explains the cost of remittances? - An examination across 119 country corridors, *The World Bank Economic Review*, 25(1), 105-131. Washington D.C.: World Bank.
- Biggs, D. (2016). How non-banks are boosting financial inclusion and remittance, in: Tasca, P., Aste, T., Pelizzon, L. & Perony, N., 2016 (eds). *Banking beyond banks and money*. Switzerland: Springer International Publishing.
- Buenaventura, L. (2017). *Reinventing Remittances with Bitcoin*, First Edition. Bloom Solutions.
- Butkus, M. & Matuzeviciute, K. (2016). Remittances, Development Level, and Long-Run Economic Growth, *Economies*, 2016(4): 28. Carlisle, D. (2017), Virtual Currencies and Financial Crime: Challenges and Opportunities. Royal United Services Institute for Defence and Security Studies, RUSI Occasional Paper (March).
- Cornelius, W. (1990). Labor migration to the United States: Development outcomes and alternatives in Mexican sending communities. *Commission for the Study of International Migration and Cooperative Economic Development Working Paper 38*. Washington, DC: Commission for the Study of International Migration and Cooperative Economic Development.
- Cuevas-Mohr, H. (2015). Are Telcos, MTOs and banks on a collision course over remittances?. Miami, Florida: Mohr World Consulting LLC.
- Das Gupta, B. & Dahlberg, D. (2015). *Indonesia: Getting Serious About Financial Inclusion*. Washington D.C.: The Institute of International Finance, Inc.

- Dermine, J. (2016). Digital banking and market disruption: a sense of déjà vu?. *Financial Stability Review*, 20:17-24. Banque de France.
- Ekanayake, E. & Halkides, M. (2008). Do remittances and foreign direct investment promote growth? Evidence from developing countries. *Journal of International Business and Economics*, 8(1): 58-68.
- El Qorchi, M., Maimbo, S. & Wilson, J. (2003). Informal funds transfer systems -
- EservGlobal (2016): *HomeSend and Vodafone to Extend M-Pesa Remittance Agreement to Five New Markets in 2016*. Barcelona: EservGlobal.
- European Investment Bank (2014). Digital Financial Services in Africa: Beyond the Kenyan Success Story. UN Capital Development Fund & European Investment Bank.
- Frankel, J. (2010). Are Bilateral Remittances Countercyclical?. *Faculty Research Working Paper Series, RWP10-037*, Massachusetts: Harvard University.
- Giuliano, P. & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics*, 90(1): 144-152.
- GPFI (2017). *G20 Financial Inclusion Action Plan, July 2017*, Report from GPFI Plenary Held in Berlin.
- GSMA (2016). *Driving a price revolution - Mobile money in international remittances*. London: GSMA.
- GSMA (2017a). *Licensing mobile money remittance providers: Early lessons*. London: GSMA.
- GSMA (2017b). *State of the Industry Report on Mobile Money*. London: GSMA.
- GSMA (2017c). Guidelines on International Remittances through Mobile Money. *Working Paper September 2017*. London: GSMA.
- GSMA (2018). *Mobile Money - Competing with informal channels to accelerate the digitisation of remittances*. London: GSMA.
- Herzog, C. & Bolli, D. (2014). M-PESAL Ein alternatives Finanztransaktionssystem in Entwicklungsländern. Zurich: University of Zurich, Institute for Computer Science.
- Holmes, E., Menzel, C. & Schlink, T. (2007). *Remittances aus Deutschland und ihre Wege in die Herkunftsländer der Migranten - Eine Studie zu fünf ausgewählten Ländern*. Eschborn: GTZ.
- Holst, E., Schäfer, A. & Schrooten, M. (2010). Gender, transnational networks and remittances: Evidence from Germany, *SOEPpapers on Multidisciplinary Panel Data Research*. DIW: Berlin.
- Hughes, N. & Lonie, S. (2007). M-PESA: Mobile money for the "Unbanked": Turning cellphones into 24-hour tellers in Kenya. *Innovations: Technology, Governance, Globalization*, 2(1-2): 63-81.
- IFAD (2016), Remittances at the post office in Africa: Serving the financial needs of migrants and their families in rural areas. Rome: International Fund for Agricultural Development.

- IFAD (2009). *Sending money home to Africa remittance markets, enabling environment and prospects*. Rome: International Fund for Agricultural Development.
- International Finance Corporation (2010a). *M-Money Channel Distribution Case – Afghanistan*. Washington D.C.: World Bank.
- International Finance Corporation (2010b). *M-Money Channel Distribution Case – Tanzania*. Washington D.C.: World Bank.
- International Monetary Fund (2009). *International transactions in remittances: Guide for compilers and users*. Washington D.C.: IMF Multimedia Services Division.
- Jack, W. & Suri, T. (2014). Risk sharing and transaction costs: Evidence from Kenya's Mobile Money Revolution. *American Economic Review*, 103, 183-223.
- Kosse, A. & Vermeulen, R. (2014). *Migrant's choice of remittance channels - Do general payment habits play a role?* Frankfurt am Main: European Central Bank.
- Krause, M. (2016). *Bitcoin Implications for the developing world*, Senior Thesis, Paper 1261. Claremont: Claremont McKenna College.
- Life Sreda (2016): *Money of the Future - Results of 2015 / Trends for 2016*, Annual Fintech Research, Singapore: Life.SREDA VC Asia.
- Lo, S. & Wang, J. (2014). Bitcoin as money?. *Current Policy Perspectives No. 14-4*. Boston: Federal Reserve of Boston.
- Mas, I., & Redcliffe, D. (2010). *Mobile Payments go viral - M-Pesa in Kenya*. Washington D. C.: World Bank Group.
- Metzger, M. (2008), *Regional Cooperation and Integration in Sub-Saharan Africa*. UNCTAD Discussion Paper No. 189 (September).
- Munyegera, G. & Matsumoto, T. (2016). Mobile money, remittances, and household welfare: Panel evidence from rural Uganda, *World Development*, 79: 127–137.
- Ntara, C. (2015). An analysis of M-Pesa use in international transactions. *European Journal of Business and Management*, 7(17): 73-79.
- Orozco, M., Lowell, L. & Schneider, J. (2006). Gender-Specific Determinants of Remittances: Differences in Structure and Motivation. *Report to the World Bank Gender and Development Group, PREM*. Washington D.C.: World Bank.
- Piracha, M. & Saraogi, A. (2011). Motivations for remittances - Evidence from Moldova. *IZA Discussion Paper No.5467*. Bonn: Institute for the Study of Labor (IZA).
- Profile Business Intelligence Ltd. (2005). *Sending money home? - A survey of remittance products and services in the United Kingdom*. Department for International Development and Banking Code Standards Board.
- Radicati, S. (2014). *Mobile statistics report, 2014 – 2018*. Palo Alto: The Radicati Group, Inc.

- Ratha, D. (2013). *The impact of remittances on economic growth and poverty reduction*, Washington, D.C.: Migration Policy Institute.
- Reeves, M. (2017). Cryptocurrency-remittance transfers futuristic technologies and poverty alleviation. Student Thesis. Saratoga Springs: Skidmore College.
- Riedler, T. (2017). *Migrant remittances: Can electronic payment systems like Bitcoin improve conditions of international money transfer?* Bachelor Thesis. Berlin: Berlin School of Economics and Law.
- Rocher, E. & Pelletier, A. (2008). Migrant workers' remittances: What is the impact on the economic and financial development of Sub-Saharan African countries? *Banque de France Bulletin Digest*, 174 (July-August): 1-18.
- Scott, B. (2016). How can cryptocurrency and blockchain technology play a role in building social and solidarity finance?. *Working Paper 2016-1*. Geneva: United Nations Research Institute for Social Development (UNRISD).
- Sirkeci, I., Cohen, J.H. & Ratha, D. (eds.) (2012). *Migration and remittances during the Global Financial Crisis and beyond*. Washington D.C.: World Bank.
- TechnoServe (2016). The digital remittance revolution in South Africa: Challenges and next steps for Africa's largest cross-border payment market. TechnoServe.
- UN Capital Development Fund (2017). *Remittances as a driver of women's financial inclusion*. UNCDF & Australian Aid.
- UNCTAD (2011). *Impact of remittances on poverty in developing countries*. Geneva: UNCTAD.
- United Nations (2019). *The Sustainable Development Goals Report 2019*. New York: United Nations Department of Economic and Social Affairs.
- United Nations (2016). *The Sustainable Development Goals Report 2016*. New York: United Nations Department of Economic and Social Affairs.
- van Hove, L. & Dubus, A. (2019). M-PESA and financial inclusion in Kenya: Of paying comes saving?. *Sustainability*, 11(3): 568.
- Wolf, L. (2019). Digital Solutions to Assist Inclusive Financial Systems? Status Quo and Potential of Ghana. Master Thesis. Berlin: Berlin School of Economics and Law (mimeo).
- World Bank Group (2019a). *Migration and Remittances: Recent Developments and Outlook, Migration and Development Brief 31, (Transit Migration)*, Washington D.C.: World Bank.
- World Bank Group (2019b). *Remittance prices worldwide: An analysis of trends in cost of remittance services, Issue 29*. Washington D.C.: World Bank.
- World Bank Group (2018). *Migration and remittances: Recent developments and outlook, Migration and development brief No. 29 (Transit Migration)*. Washington D.C.: World Bank.
- World Bank Group (2017a): *Remittance Prices Worldwide: An analysis of trends in cost of remittance services, Issue 21*. Washington D.C.: World Bank.
- World Bank Group (2017b). *Migration and remittances: Recent development and outlook, Migration and development brief No. 27*. Washington D.C.: World Bank.

- World Bank Group (2017c). Global Financial Development Report 2017/2018 – Bankers without Borders, Washington, D.C. World Bank Group (2016a). *Migration and remittances factbook 2016 - Third Edition*, Washington D.C.: World Bank
- World Bank Group (2016b). *Remittance prices worldwide: An analysis of trends in costs of remittance services, Issue 19*. Washington D.C.: World Bank.
- World Bank Group (2006). *Global Economic Prospects: Economic Implications of Remittances and Migration 2006*. Washington D.C.: World Bank.

Online Sources

- Adepetun, A. (2015). Africa's mobile phone penetration now 67 %, *The Guardian*. Available at: <https://guardian.ng/technology/africas-mobile-phone-penetration-now-67/> Accessed: 12 September 2019.
- Alushula, P. (2019). M-Pesa users outside Kenya hit 13.4 million, *Business Daily Africa*. Available at: <https://www.businessdailyafrica.com/corporate/companies/M-Pesa-users-outside-Kenya-hit-13-4-million/4003102-4956208-16s8a9/index.html> Accessed: : 12 September 2019.
- Bergmann, C. (2016). Gebührenfreie internationale Überweisungen: OKLink subventioniert Bitcoin-Remittance, *BitcoinBlog*. Available at: <https://bitcoinblog.de/2016/10/20/gebuehrenfreie-internationale-ueberweisungen-oklinksubventioniert-bitcoin-remittance/> Accessed:18 January 2017.
- Boon, H. (2017), Remittances as a trigger for postal financial inclusion, in: Asia Pathways – The Blog of the Asian Development Bank Institute (16 November). Available at: <https://www.asiapathways-adbi.org/2017/11/remittances-as-a-trigger-for-postal-financial-inclusion/> Accessed:10 September 2019
- Bull, G. (2019), Great expectations: Fintech and the poor. Available at: <https://www.cgap.org/blog/great-expectations-fintech-and-poor> <https://www.asiapathways-adbi.org/2017/11/remittances-as-a-trigger-for-postal-financial-inclusion/> Accessed:10 September 2019
- Caffyn, G. (2015). New service finds optimum bitcoin transaction fee, *CoinBase online presence*. Available at: <http://www.coindesk.com/new-service-finds-optimum-bitcoin-transaction-fee/> Accessed: 12 September 2019.
- Communications Africa (2015). Faster M-PESA payment settlement for merchants in Kenya, *communicationsafrica.com*. Available at: <http://www.communicationsafrica.com/commerce/faster-m-pesa-payment-settlement-formerchants-in-kenya> Accessed: 28 February 2017.
- Heuler, H. (2015). Kenyan start-ups tackle expensive remittances through Bitcoin, *voanews*. Available at: <http://voanews.com/a/kenyan-startups-tackle-expensive-remittances-through-bitcoin/2702724.html> Accessed: 12 September 2019.
- Internet World Stats (2019a). World Internet Usage and Population Statistics: 2019 Mid-Year Estimates (, *Internet Usage Statistics – The Big Picture*). Available at: <https://internetworldstats.com/stats.htm> Accessed: 12 September 2019.
- Internet World Stats (2019b). Surfing and Site Guide – Internet World Stats. Available at: <https://www.internetworldstats.com/surfing.htm#1> Accessed: 12 September 2019.
- Kemibaro, M. (2016). Kenya's latest 2016 mobile and internet statistics, *Moseskemibaro.com*, Available at: <http://www.moseskemibaro.com/2016/10/01/kenyas-latest-2016-mobile-internet-statistics/> Accessed: 12 September 2019.
- Kenyan Wall Street (2017). Kenya: Safaricom market share increases to nearly 70%, *african-markets.com*. Available at: <https://www.african-markets.com/en/stock-markets/nse/kenya-safaricom-market-shareincreases-to-nearly-70> Accessed: 8 March 2017.
- Mavadiya, M. (2018). Azimo: 80 percent growth in transactions sent to M-PESA wallets in Kenya, *Forbes Magazine Online*. Available at:

<https://www.forbes.com/sites/madhvimavadiya/2018/08/29/azimo-80-percent-growth-in-transactions-sent-to-m-pesa-wallets-in-kenya/#59e0b3665158> Accessed: 12 September 2019.

Maxim, J. (2015). African Bitcoin remittance service BitPesa expands to Tanzania, *Bitcoin Magazine*. Available at: <https://bitcoinmagazine.com/articles/african-bitcoin-remittance-service-bitpesa-expandstanzania-1431993506> Accessed: 15 December 2017.

Medici (2019). M-Pesa: Mobile phone-based money transfer - Global presence, *Medici Global Inc.*, Available at: <https://gomedici.com/m-pesa-mobile-phone-based-money-transfer-global-presence/> Accessed: 12 September 2019.

Nakamoto, S. (2008), Bitcoin: A Peer-to-Peer Electronic Cash System. Available at: <https://bitcoin.org/bitcoin.pdf>. Accessed: 12 September 2019

PayPal (2019). Welcome to Paypal mobile money service with M-PESA, Frequently Asked Questions, *Paypal Mobile Money*. Available at: <https://www.paypal-mobilemoney.com/m-pesa/faq> Accessed: 12 September 2019

PayPal (2016). Remittances - Public Policy, *Paypal.com*. Available at: <https://www.paypal.com/us/webapps/mpp/public-policy/issues/remittances> Accessed: 12 September 2019.

Plubins, S. (2015). Postal operators and partners in the marketplace, *Ria: African Conference on Remittances and Postal Networks*, Available at: <http://www.slideshare.net/ifad/day-1-s4-n3-plubins-ria> Accessed: 12 September 2019.

Safaricom (2017a). M-Pesa Rates, M-Pesa Tariffs, M-Pesa Withdrawal Charges, MPesa Transaction Fees, *Safaricom.co.ke*. Available at: <https://www.safaricom.co.ke/personal/m-pesa/get-started-with-m-pesa/m-pesa-tariffs> Accessed: 17 February 2017.

Safaricom (2017b). Bank to M-PESA and M-PESA to Bank, *Safaricom.co.ke*. Available at: <https://www.safaricom.co.ke/personal/m-pesa/do-more-with-m-pesa/bank-to-m-pesa-andm-pesa-to-bank> Accessed: 28 February 2017.

Safaricom (2019a). M-Pesa Global, *Safaricom.co.ke*. Available at: <https://www.safaricom.co.ke/personal/m-pesa/do-more-with-m-pesa/m-pesa-global>. Accessed: 8 April 2019.

Safaricom (2019b). M-Pesa Rates, *Safaricom.co.ke*. Available at: <https://www.safaricom.co.ke/personal/m-pesa/getting-started/m-pesa-rates> Accessed: 8 April 2019.

Statista (2019). Digital remittances worldwide Available at: <https://www.statista.com/outlook/332/100/digital-remittances/worldwide> Accessed: 10 September 2019.

Statista (2017). Number of global e-commerce transactions from 2011 to 2015 (in billions), *statista.com*. Available at: <https://www.statista.com/statistics/369333/number-ecommerce-transactions-worldwide/> Accessed: 12 September 2019.

Vodacom (2017). Pay School Fees with M-Pesa, *Vodacom.co.ls*. Available at: <http://www.vodacom.co.ls/ls-personal/services/promotions/pay-school-fees-with-m-pesa> Accessed: 12 September 2019.

World Bank Group (2017d). Remittance Prices Worldwide, *World Bank Database*. Available at: https://remittanceprices.worldbank.org/en/corridor/United-States/Kenya?start_date=1483246800&end_. Accessed: 1 April 2017.

Worldremit (2016). WorldRemit launches instant overseas money transfers to M-Pesa in Albania, *worldremit.com*. 12 May. Available at: <https://www.worldremit.com/en/news/worldremit-launches-instant-overseas-money-transfersto-m-pesa-in-albania> Accessed: 10 September 2019.

