

Enabling Digital Financial Inclusion through Improvements in Competition and Interoperability: What Works and What Doesn't?

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Abstract

The development of mobile payment platforms in developing countries is revolutionizing access to finance for the poor. Mobile payment platforms allow their users to pay and transfer funds in mobile money but also offer access to other financial products, such as savings or insurance.

In this paper we first review the economic features of mobile payment systems in developing countries, and study the cooperation models that can emerge between the different firms potentially involved in a mobile payment transaction. We then discuss the main competition concerns that public authorities should be concerned about and which regulatory tools they can consider as a remedy.

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Foreword by Liliana Rojas-Suarez

Enabling regulations can drive innovation to more effectively bring financial services to large segments of the population. The experiences of Kenya, the Philippines, and other countries have shown remarkable progress, particularly on digital financial inclusion. However, that has not been the case for many other countries where inadequate regulations continue to affect the business and value proposition to promote financial inclusion. For example, excessively tight entry and licensing requirements could prevent mobile network operators from using their extensive business networks to extend access to payments services to millions of cell-phone subscribers.

This paper was commissioned by CGD to support the work of the Center's Task Force on Regulatory Standards for Financial Inclusion. It deals with the dilemmas faced by regulators regarding the degree and timing of intervention in the market for mobile payments, especially for the purpose of fostering competition. For example, a debatable question is when to require interoperability (allowing users of one network to send electronic money to users of another network) between mobile network providers of financial services: Mandating interoperability too early can hamper innovation in the development of potentially market leading propositions. Too late might result in entrenched monopoly powers. By analyzing costs and benefits Bourreau and Valletti recommend that regulation should generally follow an ex-post approach: regulators should allow maximum scope for market development to be guided by competition between networks, while reserving a credible option for ex-post regulatory intervention should this become necessary at some point in the future in the light of market developments. The case of Tanzania illustrates how interoperability can be the result of a market solution rather than an imposed regulation.

CGD Task Force on Regulations for Financial Inclusion met for the first time in early 2014. It comprises leading experts from around the world with deep knowledge of the challenges for designing and implementing regulations for improving financial inclusion. The Task Force will produce its final Report encompassing recommendations for policymakers and international standard setting bodies in late 2015.

1. Introduction

Digital financial inclusion for the poor is becoming a reality. While traditional microfinance and banks remain important, the potential of using new technology-based platforms to serve the poor is huge. In particular, mobile network coverage and the use of a variety of indirect channels (e.g., agents) reduce the costs compared to more traditional full service branches owned by banks.

Cash is the main barrier to financial inclusion. As long as poor people rely on cash or barter, they remain too costly for formal financial institutions to serve. Once poor people have access to cost-effective digital means of payments, they can exit this trap and could in principle be profitably supplied by a range of financial institutions. Profitability, scale and serving poor customers are not incompatible anymore. Providers can offer not only mobile money, but also savings, credit, insurance, and other financial products to the poor at low cost.

Expansion of financial inclusion, however, means venturing into a new territory and brings a new set of challenges. In this paper, we first review the economic features of mobile payment systems, and then set out a framework to understand the main questions to be asked in order to further foster digital financial inclusion among the poor. We also provide a normative analysis of the main competition and regulatory concerns that are likely to arise in this very dynamic industry.

2. Economics of mobile payment platforms

a. Definition and scope

Mobile payment platforms offer mobile payment services to consumers, merchants, money agents, etc. We define *mobile payments* as the use of a mobile device (such as a mobile phone, a smartphone, or a tablet) for a financial transaction. Financial transactions include purchases at a point of sale in exchange for goods or services, consumer-to-business payments (e.g., goods and purchases over the Internet, bill payments), business-to-consumer transfers (e.g., salary payments), person-to-person (P2P) money transfers (e.g., domestic or international remittances), etc.

We note that some authors (e.g., Crowe et al., 2010, who focus on the US situation)¹ adopt a more restrictive definition of mobile payments, which excludes P2P transactions. However, as Box 1 below shows, in developing countries mobile money is mainly used for P2P domestic transfers.² We therefore include P2P transactions in our classification of mobile payments. Finally, note that our definition extends to mobile banking services that do not

¹ In the Annex, we discuss the lessons that can be drawn from the experience in developed countries, and in particular the US.

² On P2P payments in developed countries, see for example Bradford and Keeton (2012).

involve any financial transaction (e.g., checking one's account on a mobile) and to mobile financial services (e.g., micro credit and savings, insurance).

Indeed, the main issue in developing economies is to increase financial inclusion. Many economic issues are common both to mobile payment services and mobile banking or mobile financial services, and our analysis is informative in that respect too. If mobile payment systems are merely an extension of services to existing users, then there would be little new financial inclusion.³ However, the impact of mobile payment systems is far greater in that they both typically increase the number of people that use digital financial instruments, such as digital money, and they provide further opportunities to expand in various directions, including, for instance, credit and insurance.

Box 1: Mobile payment transactions in developing countries

In 2013, the GSMA ran a survey on 110 mobile money service providers from 56 different countries, representing 49% of existing mobile money services, including the most well-known services. Pénicaud and Katakam (2013) present the results of this survey, and show that domestic P2P transfers represent the most popular mobile money service in terms of number of transactions (1.3 transactions per user in June 2013) and total value (\$37.6 per transaction in June 2013).⁴ The other types of mobile money services used by subscribers are, in descending order of number of transactions per user: bill payments (0.3 transaction per user, \$26.7 per transaction), bulk payments (0.1 transaction per user, \$35.6 per transaction),⁵ merchant payments (0.1 transaction per user, \$24.9 per transaction), and international remittances (less than 0.1 transaction per user). Though international remittances represent a large market globally,⁶ the share of mobile international remittances remains low.

Different technologies can be used for mobile payments, and for accessing other financial services. In particular:

- With SMS or Unstructured Supplementary Service Data (USSD)⁷, a message is sent through the mobile network to make a financial transaction. The USSD technology allows to display on the user's mobile phone a menu of options in text mode (e.g., these options can include "transfer funds", "pay a bill", "buy credit", etc.), among

³ Exclusion is particularly prevalent in Africa as there is a significant gap in financial infrastructure compared to other developing regions (Demirguc-Kunt and Klapper, 2012).

⁴ According to the report, the most popular service is airtime top-up, which represents about three quarters of the total number of transactions. There is of course a complementarity between airtime top-up and other mobile financial services, but for the sake of the presentation, we prefer to leave it out of the scope of (purely) financial products.

⁵ They include, for example, salary payments.

⁶ In 2013, global remittances represented about \$550 billion (see: <http://www.worldbank.org/en/news/press-release/2013/10/02/developing-countries-remittances-2013-world-bank>).

⁷ USSD is a protocol used to transmit information over GSM signals. Unlike SMS, USSD messages use a real-time connection with the distant servers of a service provider. Besides, contrary to SMS, with the USSD technology, the network can check that the messages have been received.

which s/he can choose. The SMS and USSD technologies are mainly used for remittances and mobile money services.

- With mobile Internet, the financial transaction is made over the mobile Internet, that is, it uses a specific application on the mobile phone and the Internet connection to make the transaction.⁸
- With contactless or Near Field Communication (NFC), an NFC-enabled mobile device initiates a transaction with an NFC-enabled payment terminal. This technology is used for proximity payments, and can be viewed as a substitute for card payments, and in some way a complement for the SMS/USSD or mobile Internet technologies, which are more suited for remote payments.

Table 1 below provides some examples of mobile payment technologies and services for the main types of transactions (payments at POS and/or bill payments on the one hand, and P2P transfers on the other) and the three types of technologies. The SMS/USSD-based technologies are mainly used in developing countries, as they are less demanding in terms of handset technology and network quality of service. Developing a mobile payment platform based on the SMS/USSD technologies therefore maximizes the potential customer base.⁹ Note that these technologies seem as secure and safe as the other mobile payment technologies.¹⁰ The migration from USSD-based services to more advanced technologies (e.g., NFC) may be possible in the medium or long term, when the average user is equipped with an NFC-enabled handset and the network quality of service has improved.

⁸ The CPSS (2012) report excludes this technology in its definition of mobile payments. Since they define payment technologies with respect to the access channel rather than to the device, they make a distinction between mobile payments and Internet payments. In developing countries, the mobile phone is an entry point for financial services, and hence, it makes more sense to define mobile payments with respect to the device.

⁹ Another reason why mobile network operators have adopted USSD for their mobile money platforms is that they used already USSD platforms for providing airtime top-up. The incremental cost of adapting these platforms for mobile money platforms was therefore limited.

¹⁰ Some argue that as messages are sent in plain text, USSD is less secure than WAP, for example, where messages are encrypted. However, since they are developed at the lower layers of communications systems, USSD-based systems are less sensitive to hacking than mobile Internet services developed at higher layers.

Table 1: Examples of mobile payment technologies and services

Technology/ Transaction	Payment at POS, bill payments	P2P transfers
SMS/USSD and similar technologies	Mobile money services, such as M-Pesa/Safaricom (Kenya) or Orange Money/JordanTelecom (Jordan), enable consumers to pay bills and to make point-of-sale purchases. Smart Money/Smart (Philippines) and Regalli (Dominican Republic) enable customers to make bill payments.	In 2008, Obopay and Citi launched a P2P mobile payments pilot in the US, using SMS texting in particular; it was stopped in 2010. M-Pesa/Safaricom (Kenya), Orange Money (Jordan) and Smart Money/Smart (Philippines) enable consumers to make P2P transfers.
Mobile Internet	Digicash (Luxembourg) allows consumers to pay with their mobile phone at participating merchants (e.g., the supermarket chain Cora), using a bank-specific application. In different countries (USA, Australia, etc.), mobile banking apps allow consumers to pay bills.	With PayPal, customers can make P2P transfers, addressed to a recipient's email address or phone number. American Express Serve service offers similar functionalities. In Australia, some banking apps allow P2P transfers addressed to a mobile phone number, email or Facebook account.
Contactless/ NFC	The development of contactless/NFC payment solutions is still limited, in particular due to the small share of NFC-enabled handsets. Osafu-Keitai (Japan) is a technology developed by NTT Docomo and available on 33 million mobile phones; it can be used for purchases at 1.8 million retailers. Apple Pay (US) is new a mobile payment service developed by Apple that allows consumers to "store" their debit and credit cards on their smartphones to pay at participating merchants. Google Wallet (US) can be used in stores where contactless payments are accepted. Purchases can be made with the customer's Wallet Balance or with his or her preferred credit or debit card. China Telecom (China) plans to launch NFC mobile payment services.	Not relevant: contactless/NFC is a technology for proximity payments

Finally, the mobile payment service is funded either via an account of the consumer at a financial institution (e.g., a bank), or via a pre-paid account (e.g., at a mobile network operator). For example, with PayPal, a service mainly used in the US and in Europe, a consumer can either use a bank account to pay for a purchase, or the funds stored on his or her PayPal account. With SmartMoney/Smart (Philippines), the consumer can add funds to his or her account over-the-counter at a Smart store or transfer funds from a bank account. There are many other ways an electronic wallet can be loaded. For example, Enegosyo

(Philippines) offers three different ways to its customers to reload their e-wallet (including SurePay, a pre-paid payment card).

b. Expected benefits from mobile payments

We can distinguish between the short run and the long run benefits from the development of mobile payments. In the short run, given the high share of unbanked or under-banked consumers in developing economies, the diffusion of mobile payment services is a way to increase the diffusion of financial services. For example, according to Demirguc-Kunt and Klapper (2012), 24% of adults in Sub-Saharan Africa have an account at a formal financial institution (e.g., a bank) and 3% have a credit card.¹¹ By comparison, according to GSMA,¹² in 2013 the unique subscriber penetration rate in Sub-Saharan Africa was 31%, and it is growing fast.¹³ Therefore, mobile payments allow a larger share of the population to make or receive money transfers and/or payments. In doing so, the diffusion of mobile payment services also reduces the reliance on cash from consumers. Indeed, in the absence of reliable and affordable electronic payment services, consumers tend to depend on cash for their transactions. Studies conducted in developed economies suggest that cash has a strong social cost compared to electronic payment instruments.¹⁴ In developing economies, this social cost may be even higher: cash may be difficult to obtain in remote areas, and risky to hold.¹⁵ For example, King (2012) estimates that in Kenya in 2009, the average distance between a banked consumer and a bank branch was about 8km, while the distance between an unbanked consumer and a bank branch was around 16km. The development of electronic payment services, which are more secure and can to some extent eliminate distance, is therefore expected to be welfare improving.¹⁶ Notice that to the extent that governments need to hand out cash for social programs, the argument for government to be involved gets stronger as in developing countries it can be very costly to ship cash to remote areas.

In the longer run, the development of mobile payment platforms can also stimulate innovation in financial services around the platform, that is, the development of applications or services that fit consumers' specific needs (e.g., for cash handling and deposits, transactions, financial services such as credit, insurance, savings, etc.) and can be accessed via the platform. In Kenya, Kendall et al. (2012) estimate that 90 independent financial service providers have integrated with the existing mobile money platforms (mostly, M-PESA). For example, Musoni is a micro-finance service, where all transfers (disbursements and

¹¹ Note that the share of banked adults is much lower in rural areas than in urban areas (see, e.g., King, 2012).

¹² "Sub-Saharan Africa Mobile Economy 2013", available at [http://www.gsmamobileeconomyafrica.com/Sub-Saharan Africa_ME_Report_English_2013.pdf](http://www.gsmamobileeconomyafrica.com/Sub-Saharan%20Africa_ME_Report_English_2013.pdf)

¹³ As consumers may hold multiple SIM cards, the penetration rate measured as the number of SIM cards over the population can be twice as high.

¹⁴ For example, see Bergman et al. (2007). They estimate a social cost of cash of 0.52 euro per transaction at a point of sale. Schmiedel et al. (2012) show that it is not necessarily true in all European countries; in some countries, cash has the lowest social cost per transaction.

¹⁵ In some countries, mobile payment users cash in before a bus trip and cash out when they arrive, to avoid being robbed on their trip.

¹⁶ See also Economides and Jeziorski (2014) who analyse individual-level mobile money transaction data in Tanzania.

repayments) are done through M-PESA; Kopo Kopo is a service that helps merchants to deal with mobile money payments. Box 2 shows the fast development in many developing countries of microinsurance products that are based on existing mobile platforms. We expect innovation in financial services to foster once the mobile payment platform has attracted a large enough customer base, which may explain why the M-PESA platform is the most advanced in this respect.

Box 2: Mobile microinsurance¹⁷

Tellez-Merchan and Zetterli (2014) provide evidence of the fast development of mobile microinsurance products in developing countries, with 84 products available in 14 different countries in 2013, most of which being offered by mobile network operators. For example, the Linda Jamii platform, a partnership between Safaricom and Britam, an insurance company, offers mobile health microinsurance to low-income consumers in Kenya. In Senegal, Tigo Senegal partnered in 2012 with the microinsurance company Bima and the insurer UASen Vie to propose a mobile life insurance product, Tigo Kiiray, to its GSM subscriber base. One year and a half after its launch, it had around 400,000 consumers for this micro insurance product. The product is sold as a “freemium” service: customers who spend \$3.13 per month or more for mobile services are offered a basic life insurance service for free; they can also decide to enroll for the premium service, with larger coverage, which is charged \$0.69 per month on the mobile account. Telenor Pakistan has launched a similar micro insurance freemium service, Talkshawk Mohafiz, in 2013, which attracted 400,000 clients in the first two months of operation. These examples, where the microinsurance service is offered as a reward by a mobile platform to its active consumers, shows that new financial services are viewed by mobile platforms not only as a new revenue stream, but also a way to increase consumer loyalty. Furthermore, the examples highlight that partnerships are key to the success of a new financial service on an existing mobile payment platform.

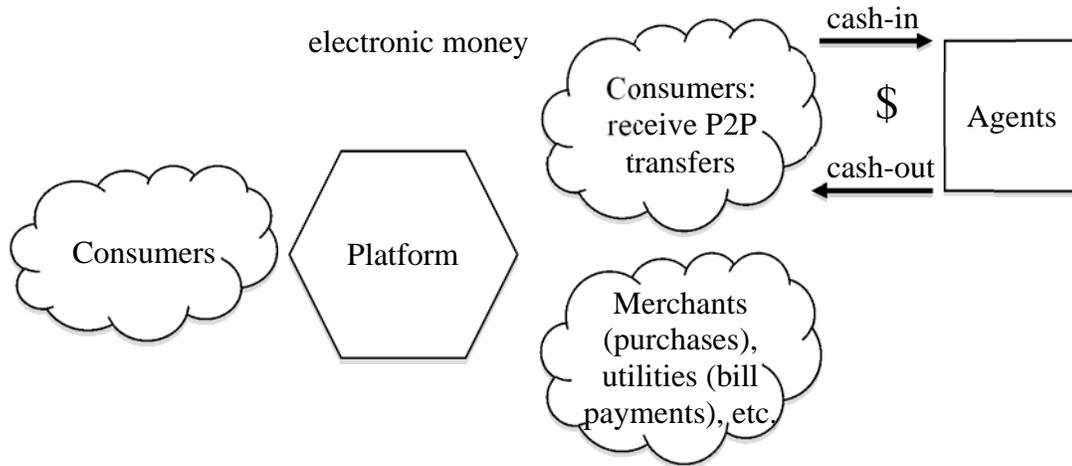
c. Mobile payment platforms

A mobile payment platform allows two groups of users to make financial transactions via mobile: on one side, consumers and on the other side, other consumers (for P2P transfers), and/or merchants (for purchases, bill payments, etc.). Another group of users can be involved: agents; see Figure 1. Agents allow consumers to convert cash into electronic money (cash-in), and back again into cash (cash-out).¹⁸ Mobile payment platforms with cash agents are usually called mobile money platforms. For simplicity, and in order to remain general, we will talk about mobile payment platforms, whether the platform relies on cash agents or not.

¹⁷ See Tellez-Merchan and Zetterli (2014) and <http://cfi-blog.org/2014/08/29/the-formula-for-mobile-microinsurance-success-in-senegal-and-pakistan/>.

¹⁸ Agents are sales and service centers (small/very small bank branches) or small cash-in / cash-out points. Building a large agent network is essential for the success of a mobile money platform as it allows users to pay in and collect money sent by friends and family.

Figure 1: Mobile payment platforms



It is useful to note that, in principle, agents can also be merchants themselves. However, it makes sense to keep them separate in the ensuing analysis as their business models are different, and they also cater for different needs according to the degree of financial maturity of a certain country. Agents are usually small retailers, and are paid a commission for offering the service. This is in contrast to merchants that generally do not facilitate these exchanges, but simply accept electronic payments in exchange for the goods or services they provide. The merchant is typically charged a fee by the provider for using the mobile money service. Merchant payments thus add another case for mobile money, by enabling customers to pay for goods and services from the value stored on their mobile wallets, and are a feature of more advanced markets. This additional service also incentivizes customers to store money electronically as it becomes more useful tool for making payments. Kopo Kopo in Kenya entices businesses to become merchants by providing them with business analytics from the transactions they make on the system. However, the design of this system means that it is generally targeted at more sophisticated businesses that generally were not previously targeted as mobile money agents. The result in Kenya is that, instead of building on top of the agent network, the merchant network seems to be evolving mostly alongside it.

Mobile payment platforms can be viewed as *two-sided platforms*, due to the externalities between their two sides: the higher the number of potential recipients for money transfers (other consumers, merchants) or the higher the number of agents, the higher the benefits for a given consumer to join the platform; conversely, the more consumers adopt the mobile payment system, the higher the incentives for merchants, potential recipients and agents to join.

Due to their two-sided nature, mobile payment platforms exhibit barriers to adoption on the demand side. If the users on one side of the platform (say, merchants) do not expect the users on the other side (say, consumers) to join, the platform will be unable to attract any users. To be successful and to overcome this “chicken-and-egg” problem, it is critical that the platform convince at least one side of the market to join. This observation has

repercussions for pricing policies and regulatory options. Governments can try to stimulate adoption on the consumers' side by moving government to person (G2P) payments (e.g., pension or welfare payments) and person to government (P2G) payments (e.g., tax payments) towards mobile platforms. In Afghanistan, for example, policemen receive their salaries via the M-PAISA mobile money service. In Philippines, tax payments can be made through the Bayadload mobile money platform. In India, welfare and social aid payments are done via mobile money services.

There are barriers to adoption on the supply side of mobile payment platforms too. Due to the sunk costs of infrastructure, mobile payment and mobile money systems are characterized by the presence of economies of scale. The platform has therefore to reach a large enough scale to be able to offer affordable services to users. This is of particular importance if consumers' willingness-to-pay is very low.

Users' incentives to join a mobile payment platform (when available) depend on the number of users on the other side as we have already explained, on the price of the service, and on its quality, as well as on the value of the outside option (i.e., keeping using cash). Here, we can make a distinction between two scenarios: the service provider can be the platform itself (closed platform), and/or it can be an independent service provider that accesses the platform to provide financial services (open platform). In the former case, users typically pay a price to the platform in exchange of a service managed by the platform. In the latter case, users can pay a price both to the platform and to the service providers, for different services. From a policy perspective, there are benefits to vertical integration, as the platform can internalize the complementarity between mobile financial services and mobile money services. However, the platform may not have the capability of delivering a large enough variety of services, which may warrant some degree of openness, at least when the platform has matured.

In the case of an open platform, there are potential barriers to entry or innovation that may in turn affect users' adoption decisions. First, service providers have to incur integration costs to connect their service infrastructure to the platform. Well-designed and standardized application programming interfaces (APIs) reduce integration costs for services providers, but APIs may be functioning poorly. For example, Kendall et al. (2011) highlight that independent service providers find it hard to connect to M-PESA's mobile money platform due to the low quality of the platform's APIs. Second, on an open platform, security has a public good nature. If a service provider makes insufficient efforts in securing the transactions of its clients, strong security problems (e.g., frauds) can occur, which would of course damage the reputation of the service provider, but would also risk to spill over to the platform itself. We will come back on this issue in Section 3 on competition concerns, when we discuss entry controls.

d. Cooperation for mobile payment services

In the previous section, we assumed that the mobile payment platform was operational and briefly discussed the users' incentives to join it. An important question is however whether a mobile payment platform or service can actually emerge.

To answer this question, it helps to see a mobile payment (platform) service as a combination of different inputs:

- A mobile network service, provided by a mobile network operator (MNO).
- A mobile handset, provided by a handset manufacturer.
- A bank account, provided by a bank.
- An acceptance network, provided by payment network (e.g., Visa).
- An agent network, either provided by an existing mobile money platform or rolled out by the service provider.
- An NFC chip, provided by a hardware manufacturer (e.g., Gemalto).
- Software, provided by a software application provider.

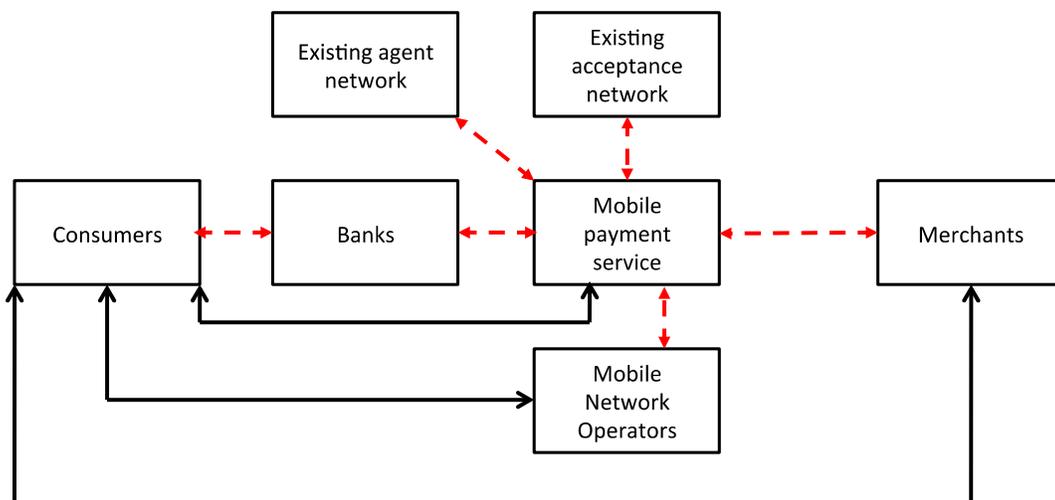
Obviously, a mobile payment service requires at least a mobile network service, a mobile handset and some software. However, a mobile payment platform's service depends heavily on the nature of its relationships with the different input suppliers. Some of them have moderate market power (hardware manufacturers, software application providers); we therefore expect a payment platform to access these inputs at competitive conditions. Others (MNOs, banks, payment networks, agent networks, and possibly handset manufacturers) have more market power and access to the inputs they provide may involve a partnership with the input supplier. Alternatively, the mobile payment platform may decide to bypass these key input suppliers, if it does not succeed to find an agreement.

The mobile payment platform can bypass the MNOs by installing the payment application in a separate memory card instead of using the consumer's SIM card (controlled by the MNO) or by providing the payment application as a mobile application. For example, in Luxembourg, Digicash allows consumers to pay at some participating merchants with a mobile phone, by downloading an application for the Android or iOS platforms, which is bank-specific. Note that in developing countries, the USSD technology that is mainly used does not allow to bypass the MNOs, because it requires access to the MNO's core networks. The consumer's bank (if s/he has any) can be bypassed by setting up a prepaid account or an e-wallet. For example, in Senegal and in other countries, Orange Money users can credit their e-wallet by cashing in at an agent. Finally, the mobile payment platform can develop its service without the cooperation of an acceptance network; e.g., it can focus on P2P

transactions (in which the acceptance network is irrelevant) and/or target a few merchants to affiliate. In case of mobile money, it can roll out its own agent network, instead of requiring access to an existing network (see below for a discussion on agent-level interoperability).

Figure 2 represents the economic relationships between the different players that might be involved in a mobile payment solution. The solid lines represent economic relationships that necessarily exist, while the dashed lines represent economic relationships that may or may not exist, depending on the service offered by the platform. Indeed, the platform may decide to cooperate with some of the key input suppliers, or to bypass them.

Figure 2: Economic relationships between the players involved in a mobile payment service



Since, as we have seen, each one of the three potential inputs suppliers (MNO, bank, payment/agent network)¹⁹ can be bypassed or not by the mobile payment service provider, we have several cooperation models that can emerge. We consider that cooperation between the mobile payment service provider and each input supplier can be either weak or strong. Strong cooperation can take place either through a joint venture, vertical integration, or M&A.²⁰

There are clearly complementarities between MNOs, banks and payment/agent networks: they offer complementary services, and have also balancing capabilities for the design of a mobile payment solution. However, the potential for cooperation between these different players is limited, especially when they actually compete to control the distribution of mobile payments. MNOs view mobile payments as a new revenue channel, in context where their

¹⁹ For simplicity, we ignore here the role of handset manufacturers.

²⁰ Ozcan and Santos (2014) argue that another “pathway” to commercialization is the mediation of a trusted third party.

existing revenues streams saturate, and as a way of increasing their customers' loyalty. For banks and financial institutions, mobile payments represent a source of differentiation, of new revenue streams, and it may also help them to reduce their costs. Ozcan and Santos (2014) argue that cooperation between MNOs and banks is all the more difficult as the potential partners hold dominant positions in different markets. Ultimately, cooperation depends on whether banks see opportunities beyond the traditional banking sector or whether they see strategic threats to their core business.

e. Different cooperation models

Bourreau and Verdier (2010) identify five different cooperation (business) models for mobile payments, out of the theoretically six possible models.

- With the “light” model, the cooperation with the other players and input suppliers (banks and acceptance/agent networks) is minimal. Examples include PayPal or Amazon Mobile Payments Service. In Kenya, the service providers that use an access to M-PESA’s platform are also examples of the light model.
- The “mobile-centric” model relies on a strong cooperation with a mobile network operator, while the cooperation with banks and acceptance/agent networks is minimal. The initial mobile prepaid solution proposed by NTT DoCoMo in Japan corresponds to the mobile-centric model.²¹ A mobile money platform that would have a smaller agent network than her rivals is another example.
- With the “bank-centric” model, banks develop a mass-market mobile payment solution without the cooperation of MNOs. An example is the MOVO service of Caisse d’Epargne in France, a payment service by SMS that was available to consumers between 2006 and 2009.²²
- The “partial integration” model takes place when there is a strong link between a bank and a MNO, but no cooperation with the acceptance/agent networks. As an example, Orange has decided to provide its Orange Money service in different countries (Madagascar, Mali, Senegal, etc.), in partnerships with local banks, while building its own acceptance/agent network.
- Finally, the “full integration” model corresponds to a situation of vertical integration over the value chain, where a single company provides mobile services, payment services, and has access to a large acceptance/agent network. Examples include the mobile operator NTT DoCoMo in Japan, which acquired a bank and a large

²¹ NTT DoCoMo launched its contactless handset, Felica, in 2004, with a prepaid service. To be able to develop the service and offer full payment services, NTT DoCoMo later on bought a bank.

²² The service was stopped because of low transaction volumes (due, probably, to service limitations and too high prices).

retailer,²³ and M-PESA in Kenya. The so-called “Peru Model”, a mobile money project led by the Association of Banks of Peru (ASBANC) that the main Peruvian banks and telecommunications operators have joined, is another example of the “full integration model”.

These different models involve different degrees and different forms of cooperation. The “light model” involves the lowest degree of cooperation with the key input suppliers. Therefore, entry barriers are lower with this model, but the possibility to target more than a niche market seems limited. However, the “light model” may be an efficient form of cooperation for the development of financial services on an existing payment platform that target specific (“niche”) consumer needs. The “bank-centric” and “mobile-centric” models involve a strong degree of cooperation with either a bank or a mobile network operator. Banks have experience in offering a variety of financial services to consumers, and in risk and fraud management. Furthermore, regulations may require banks to be involved in any mobile payment solution (this is the case, for example, in India). In developing countries, MNOs usually operate a USSD platform for airtime top-up, which can be upgraded to provide mobile money services. Mobile money services seem also to be a strong complement to mobile telephony services, and to enhance consumer loyalty. Finally, the “partial-integration” and “full-integration” models involve strong cooperation between the main players. A high degree of cooperation has benefits, due to the complementarities or synergies between the different players, but it has also costs, in particular in terms of negotiation or coordination.

There is no preferable model *per se*, or in the words of GSMA (2013), “there is more than one workable business model.” Mobile payments are a major innovation, both in developed and developing economies, and the industry players should experiment to find the “right” business model(s). Teece (2010) argues that technological innovations often require new business models to succeed in the market place, and consequently “new business models can themselves represent a form of innovation”. Firms that are uncertain about which business model is the right one have to go through an experimentation phase (Chesbrough, 2010), which may involve incremental adjustments of the traditional business model (Demil and Lecocq, 2010). The various examples that we provide in this paper highlight that mobile payment platforms experiment constantly, in terms of services, pricing, etc. This experimentation path should be left to the market.

3. Competition concerns

Competition, when feasible, is normally a healthy solution for the delivery of goods and services. This rule of thumb is also applicable to mobile payments. Yet, there are some

²³ As explained in Section 1, the service (Osai-fu-Keitai) is a mass-market success. According to a study by Accenture in 2011, about one third of active mobile users in Japan had used the service in the last six months (see: http://enterprise.vodafone.com/insight_news/2013-08-13-tokyo-drift-how-japan-leads-the-way-on-m-payments.jsp).

peculiar characteristics of mobile payments that can give rise to concerns. These have to be understood first, and obviously prior to suggesting possible regulatory interventions.

a. Network effects

Network effects refer to the ability and utility that consumers have to interact with many counterparts. In the absence of interconnection between competing networks, positive network externalities mean that consumers will typically want to join the largest network. This effect, if not counterbalanced by product differentiation or consumer switching costs, implies that the largest network will grow larger and larger, until it may capture the whole market as a limiting case. While in itself this may be a daunting case, as the remaining operator will have uncontested monopoly power over customers and can therefore exploit them, the dynamic process related to network externalities is actually more interesting and less scary. Especially in an initial phase of the market, network effects imply that rival platforms will compete very fiercely to establish a leading position in the market. In other words, there will be an initial phase of competition “for the market” with cheap prices, which may be followed by not very intense competition “in the market” in the longer term. Since network effects in payment systems (in particular, P2P transfers) are mostly related to national geographic markets (as people tend to conduct transactions within a geographic area that is, at most, national), what matters is the national market size, while the presence of operators in multiple markets (e.g., pan-African MNOs or foreign banks) does not help in itself to increase or decrease network effects (though multiple market presence may of course be a signal of experience and expertise).

Network effects can also be a barrier to entry in the absence of interconnection between platforms. This is because a new entrant is unlikely to be able to attract customers. In this sense, interconnection and interoperability between networks can be an appropriate solution in order for everybody to enjoy positive network externalities. Whether this should be mandated or not depends on the relative positions of competing platforms. In a market with symmetrically placed competitors, it is expected that they will realize the mutual benefits they can get, as extra value to the customers is created due to the increase in positive network effects. This is expected to expand the market by stimulating additional demand and attracting new subscribers. The picture however changes quite radically with asymmetric firms. In such cases, the largest firm will typically refuse interconnection, unless sufficiently compensated for it.

If markets are truly start-ups or just developing, interconnection should probably not be mandated de jure, as one would first want to see if the principle of competition “for the market” could prevail. Eventually, if network benefits are really strong, competing firms will have mutual incentives to interconnect in any case (de facto, rather than de jure), to stimulate market growth. The incentive to interconnect is also likely to arise in more mature markets as long as firms are symmetrically placed. Instead, one would want to concentrate on interconnection when markets may tip in favor of one player who will typically want to refuse interconnection. The examples of Kenya and Tanzania (see Box 3) is revealing in this

respect. The lesson there is that there has been strong competition for the market in both countries. Regulatory intervention (or anticipation of such intervention) is playing a role in Kenya more recently, when the market was tipping. Instead, in Tanzania, voluntary interconnection among the smaller players emerged to become credible contestants against a larger incumbent.

The examples from Kenya and Tanzania also show that there are various levels of interconnection, so that “opening” the network is often just a step but not sufficient to ensure that network effects are enjoyed in full. More precisely, interoperability can be achieved at three different levels:²⁴

- At the mobile network level: customers can access their mobile money service through any SIM card.
- At the agent level: the agents for one service can serve consumers of another service (no exclusivity). This is the level of interoperability proposed by M-PESA in Kenya.
- At the platform level: money transfers can be both on-net and off-net; that is, a user of one service can send electronic money to a user of another service. This is the level of interoperability negotiated among operators in Tanzania.

²⁴ <http://www.cgap.org/blog/interoperability-branchless-banking-and-mobile-money-0>

Box 3: Interoperability in Kenya and Tanzania²⁵

M-Pesa is the leading mobile money service offered in Kenya by Safaricom. M-Pesa lacks interoperability with any of the rival services run by the country's three other operators: Airtel, Orange and yuMobile. Yet, it has been and still is very successful. Given its success, Safaricom is now under pressure to change its ways. In July 2014, Safaricom [opened up its network of M-Pesa agents](#) to its rival Airtel. This was a commercial decision, according to Safaricom. The operator's unilateral move came just before the Competition Authority of Kenya (CAK), the country's antitrust regulator, ordered it to open up its extensive network of 85,000 agents to rivals. This is a case where a success due to own merits and network externalities faces at some stage an increased risk of regulatory intervention. In other words, the greater a service's take-up, the more likely it will be forced to nurture rivals.

Safaricom is a different story in mobile money compared to other experiences where interoperability is being introduced. Three of the leading operators in Tanzania announced [an agreement in June 2014](#) to let subscribers send and receive mobile money with the users of rival services for the first time. Tigo, Airtel and Zantel – three of the country's four largest operators – agreed to allow users to send money directly between one another's mobile wallets. The operators hailed the arrangement as the first such deal in Africa, although the country's largest operator – Vodacom – did not sign up. Vodacom also offers M-Pesa in Tanzania.

At a closer look, the Kenyans recent developments are more nuanced. Safaricom is opening up its M-Pesa agent network so rival Airtel can approach and sign them up to act as its agents too (“agent-level interoperability”). But that is not the same as implementing full interoperability with its rival. An Airtel user cannot send cash from their mobile wallet to the mobile wallet of an M-Pesa users. That requires a link between the two operators' mobile money systems. Airtel is still pushing hard for that arrangement. When it does, the market will see what “real” interoperability can deliver.

When mobile money platforms are not interoperable, electronic money sent to a consumer on a rival mobile network generates a voucher, which can only be cashed out at an agent from the sender's network. In other words, electronic money cannot circulate off-net.

b. Leverage of market power and foreclosure

Bundling is a strategy that joins products or services together in order to sell them as a single combined unit to customers. This may cause competition concerns if market power can be leveraged from one product to a bundled one. As an example, a mobile operator with market power in mobile services or a manufacturer with market power in the handset market (such as Apple) might try to leverage market power over complementary goods such as mobile payments. While this is a possibility that cannot be excluded, it does not seem so endemic to

²⁵ See <http://www.mobileworldlive.com/ending-m-pesas-solo-story>

require a regulatory intervention ex ante. It is preferable to tackle this occurrence ex post, via competition law, and on a case by case basis.

Related to this, and possibly a greater source of concern, is the potential of existing market power in traditional payment systems being used to limit or delay the development of mobile payments. The degree of this will depend on the extent to which mobile payments systems rely on access to bank clearing systems and the pre-existing market power of banks. The banks' incentive to foreclose the market in turn depends on whether mobile payment systems are seen to be a substitute for or complement to traditional banking services.

If a mobile payment system is initially developed as a "closed" system, it may later require access to an existing conventional payment system, such as the national bank clearing system or credit card networks, in order to facilitate transfers or for transactions to take place between customers of the mobile payment system and customers of the existing banking system. As national bank clearing systems are typically run by banks, it is possible that banks could seek to restrict access to an operator of such a mobile payment system, operated by a non-bank.

The key question is whether and under what conditions a bank, or group of banks, would have an incentive to do so. This depends on the expected benefits and costs from providing such access. If the deposits of the mobile payment system are re-invested in the domestic financial system, then the overall availability of domestic capital might be expected to increase. Thus, the mobile payment system could raise the level of deposits made by people with no existing bank account. However, if the deposits are not re-invested in the domestic financial system, or if mobile payments capture market shares away from traditional financial systems, then this could potentially reduce the capital/liquidity available to banks.

Additionally, if the mobile payment system providers intend to engage in the provision of other revenue-generating banking services (such as lending or the provision of additional financial services) on the basis of the initial deposit-taking and transactions services, then this could be seen as a threat to either actual or future potential banking revenues. The greater the opportunity for generating additional revenues, and the larger the mobile operators relative to the banks, the greater the perceived threat to banking revenues.

To the extent that access to the clearing system would facilitate the expansion and take-up of mobile payments, banks could seek to restrict access to clearing strategically to minimize the potentially negative effect of the growth of mobile payment systems on their own profits. In the event that the mobile payment systems are more efficient than traditional payment mechanisms (which could be likely where the conventional banking infrastructure is poor), this could result in productive inefficiencies, especially for certain types of transactions such as micro transactions. Such an outcome, could therefore lead to some consumers continuing to have to use higher cost services, or having a more restricted ability to execute transactions.

4. Regulation and challenges

Before intervening in a market, a regulatory authority should first assure itself that, left on its own, the market would not generate an efficient outcome, and that the benefits of intervention will outweigh any costs associated with it. Regulatory intervention to deal with competition concerns in the telecommunications sector can be broadly classified as either *ex ante* regulation, or *ex post* regulation.

Ex ante regulation refers to a situation where, a regulatory (or other relevant) authority establishes that, absent such *ex ante* intervention, the abuse of a dominant position (or other market failure) will occur. As a general principle therefore, *ex ante* regulation should be imposed only if there is an expected market failure that can be avoided or mitigated more effectively by pre-emptive regulatory intervention than by *ex post* intervention, if and when a market failure has occurred. In the case of *ex post* intervention, regulatory remedies are imposed only following an investigation and establishment of a market failure as a result of anticompetitive behaviour by market participants. This type of intervention typically relies on the principles of general competition legislation, applicable to any sector of the economy, rather than sector-specific regulation.

In the case of the introduction of a new system or service, *ex ante* regulation may be appropriate to ensure that rival systems are interoperable. There are a number of approaches that an authority could take to furthering this aim, ranging from relatively interventionist strategies, such as requiring operators, through *ex ante* regulation, to ensure the technical interoperability/interconnection of their respective systems, to a light-touch approach, such as requiring the creation of a standards body (co-ordinating and approving standards for mobile payment systems).

Financial sector regulation is also *ex ante*, but, somehow in contrast with telecommunications regulation, *ex post* supervision is less aimed at market conduct (one exception is the oversight of risk management in payment systems which is in place in many countries), but more at financial stability. This different approach, which is rooted in banking regulation and concentrates especially on the *ex ante* part for very good reasons, may however be too heavy handed in the initial phases of the development of mobile payment systems, as we argue next.

a. Objectives

In order to establish whether or not regulatory intervention is needed, one should first ask what objectives should be achieved, followed by an analysis of the appropriateness of the instruments available for an identified intervention. As for the objectives, they are typically standard, such as the development of a competitive environment, or the quality of payment infrastructures. Yet, it is important that these are clearly defined, and not too many: too many goals water down the main purpose of an intervention, and certainly do not help for the accountability of regulatory bodies.

Another objective, which is specific to payment systems, is the security of transactions (e.g., minimizing fraud, avoiding money laundering, etc.). Transactions that are unsecure reduce users' trust in payment instruments, which in turn reduces their usage. There are therefore strict rules for becoming a payment service provider.

b. Instruments

I. Entry and exit controls

One standard instrument for the regulator is the control of entry, via authorizations or licenses. Control of entry enables the regulator to refuse entry of inefficient service providers, for example, if they do not have the technical and financial capabilities to provide a good quality of service. In the payments industry, there are also specific risks associated with the entry of new players: operational risks (e.g., in terms of data security or fraud), and reputational risks (if failure of a new player in terms of security hurts the reputation of all players)²⁶ However, imposing too stringent entry conditions could slow down the development of mobile payment services, in particular given the two-sidedness of the market, as the Indonesian example shows (see Box 4 below).

In a similar vein, exit rules, which specify obligations for mobile payment platforms in case they exit the market, should not be too stringent. Very detailed and demanding exit rules would raise exit costs, which in turn would create barriers to entry for new mobile payment platforms. In any case, also exit rules – when present – should be clear, transparent and well understood by all stakeholders, else they would just add an extra layer of uncertainty.

II. MNOs' off-net (termination) fees

In view of the network characteristics of telecommunications markets, regulators have also considered measures that could facilitate the emergence of stronger competition – typically measures related to the ease of switching between alternative service providers. The framework used in the assessment of the need to introduce such measures varies from country to country, but they have been typically considered and introduced as a way of facilitating competition. Box 4 above also highlights a very typical feature of telecoms, which often involve cross-network transactions among customers belonging to different MNOs, that may require regulatory oversight of the so-called “off-net” (or “termination”) fees.

We now consider the role of regulation in relation to the different potential competition concerns that could be raised in the development of mobile payment systems.²⁷

²⁶ See Weiner et al. (2007).

²⁷ See Houpis and Bellis (2007).

Box 4: Regulation of entry and off-net fees in Indonesia

In Indonesia, the three mobile network operators (Telkomsel, Indosat and XL) are offering mobile money services, competing with banks and service providers. When mobile money was launched in 2007 by Telkomsel, Bank Indonesia requested cash agents to ask for a remittance license. In April 2009, it also issued a regulation which allowed small banks and mobile network operators to partner with registered legal entities, such as convenience chain stores, for their agent networks, but not with individual stores. As a consequence, the mobile operators were unable to build large agent networks, and until 2013, they each had only 25 agents nationwide. New regulations were introduced in 2013 and 2014 to stimulate the development of mobile money services (the Regulation on Funds Transfer of March 2013, the branchless banking pilot guidelines of May 2013, and a regulation of April 2014 allowing non-banks and individuals to apply for e-money licenses). With these new regulations in place, it has become easier for mobile operators to roll out their agent networks, and thousands of agents have since then entered the market.

The on-net and off-net fees for money transfers are different.²⁸ While transferring electronic money on-net is free, it costs IDR 2,000 (around USD 0.20) to send money off-net. This fee is then shared between the originating and receiving networks. A question for the industry is whether the discrimination between on-net and off-net money transfers should be removed, in particular if the cost of off-net money transfers encourages cash-ins/cash-outs, which are costly for the industry players. To the extent that one can borrow from the experience in mobile voice communications, off-net transfers may need to be capped by regulatory interventions. A less intrusive intervention would be to require reciprocity of such transfers in each direction, without specifying the level. The situation to be avoided is one where each party sets unilaterally the off-net fees for the other party, as this leads to multiple mark-ups that result in too high prices for end users. This may also have the consequence of inducing extensive multi-SIM use, and it is unclear whether using this model would be optimal for mobile money.

The experience from interchange fees in developing countries also suggests that off-net transfers should be capped. Interchange fees are inter-bank transfers when a consumer pays with a payment card at a merchant: the merchant's bank (the "acquirer") has then to pay an interchange fee to the consumer's bank (the "issuer"). Over the last few years, interchange fees have been reduced in several countries (e.g., in the US in 2011) or capped (e.g., in Australia in 2003 and 2006 and in Spain in 2005).

²⁸ On-net transactions are those between customers belonging to the same provider, e.g., a customer of MNO A sending money to another person also subscribing to MNO A. Off-net transactions would involve, instead, a customer of MNO A sending money to a customer of MNO B.

III. Regulation and interoperability

The challenge is to determine how and when to intervene to secure interoperability, recognising that intervention can have both costs and benefits. Given the uncertainty about the development of the mobile transactions market, there should be no general presumption that the regulatory imposition of interoperability will improve economic efficiency. It is possible that mandated interoperability could hamper market development, for example if the regulator inadvertently dampens competition and innovation in the development of potentially market leading propositions. Given this, *ex ante* regulation should focus on ensuring that interoperability remains feasible at low cost but should not be used to mandate interoperability at the outset. The key advantage of this approach is that, correctly specified, it can allow maximum scope for market development to be guided by competition between networks, whilst reserving a credible option for *ex post* regulatory intervention to secure interoperability, should this become necessary at some point in the future in the light of market developments.

Under this approach, *ex ante* regulation should focus on ensuring that firms do not take actions that increase the barriers to achieving interoperability. The details of this will be country- and system- specific. As shown earlier on, the notions of interoperability are various, and have been applied at different levels, for instance, in Kenya and Tanzania (Box 3).

Interoperability becomes a regulatory option only in later stages of the market development, but not in initial stages when commercial agreements are also feasible, and possibly only if and when dominant positions are present in the market. In Tanzania, where agent exclusivity is not permitted, the regulator stated preference for the market to arrive at an interoperable solution on its own, which is indeed what has happened. Regulations do not mandate but offer a framework for interoperability driven by market value propositions. This outcome is facilitated by having a competitive MNO environment, with three operators that have teamed up to fight the largest (but not dominant) MNO provider. Similarly, the central bank of Congo (Banque Centrale du Congo) does not openly encourage mobile platforms to interconnect. Mandating at an early stage is likely to jeopardise market development. Moreover, the mobile sector in Congo is fairly competitive, with no single operator having more than 30% of the market. In Indonesia, three mobile network operators have decided to become interoperable from the outset, allowing customers to seamlessly transfer funds across networks. By 2012, each of the three operators had established payments systems on their own, but in a geographically dispersed country like Indonesia, isolated payments schemes are unlikely to have enough reach to drive significant usage. The first step was a discussion between the second and the third MNOs (XL and Indosat), in terms of market share, who had the greatest interest in finding an agreement. They then invited the largest provider (Telkomsel, with more than 50% market share) to be part of the collaboration that was eventually finalised in only six months.

Box 5: Full interoperability through a single platform -- The “Peru model”²⁹

In Peru, prior to 2012, financial institutions mainly focused on the top 30% of population, due to the low value of poor consumers. The potential for mobile money services was however high, with 71% of adults having a mobile phone according to the 2011 National Household Survey. In 2012, two regional mobile money platforms were launched: Wanda (a partnership between MasterCard and Telefonica), and Transfer (a joint project of America Movil and Citibank). The Peruvian government decided to encourage these projects by changing existing regulations, and allowing entry of non-banks. However, eventually, these two regional projects did not take off, due to a lack of customer interest. The Association of Banks of Peru (ASBANC) then decided to launch an initiative to create a national mobile money platform that would be available to all banks and telecom operators in Peru. The main banks, as well as other financial institutions (e.g., micro-finance companies) and telecommunications operators, have since joined the initiative and the service is expected to be launched at the end of 2014. The “Peru model” is described as an “an ecosystem of mobile payments” (Cámara and Tuesta, 2014). Via the mobile platform, consumers will have access to a variety of financial services he consumer will be able to access a wide range of financial services (for payments, transfers, cash-in/cash-out, etc.).

Finally, another scenario involves “full cooperation” between industry players for a single platform, which corresponds to the “Peru Model” for example (see Box 5). The benefit of having a shared mobile money platform is that interoperability is already “built-in”. The downside is that a single platform is created from the outset, bypassing the early phase of competition for the market. The question is also whether participants to a shared platform have enough incentives to develop the platform’s services, given that their possibilities of differentiation may be limited.

IV. Regulation and clearing

The previous analysis of the potential for foreclosure from access to a national bank clearing (or similar) system, suggests that the traditional banking system may, in some circumstances benefit from the introduction and expansion of mobile payment systems, if these result for example in the expansion of banking services to the unbanked. This is of particular relevance in countries with a relatively large share of unbanked populations and where mobile platforms create access and distribution networks that have significantly greater coverage than conventional banking services. There are also other potential costs, and benefits, that banks will be expected to evaluate.

Policy makers should be concerned with ensuring that access to a national bank clearing system does not increase unduly the risk for the system as a whole, or other individual participants. To the extent that the access seeker is not going to engage in revenue generating banking activities, then the requirements for access to the system should be no

²⁹ See Cámara and Tuesta (2014) and <http://www.mobile-money-global.com/Content/Jeffery-Bower-Better-Than-Cash-Alliance>.

more stringent than necessary to meet the objective of ensuring no increase in risk from such access. Requesting a mobile payment provider to obtain a full banking licence in order to have access, could be too onerous a requirement, in the absence of such provider offering banking services. At the other extreme, too weak criteria could generate operational, financial, or legal risks. What would be the proper criteria is currently reviewed in the European Union, which considers the possibility of allowing non-banks to payment and settlement systems.

Were such provider to seek to offer banking services in the future, and compete with existing/traditional bank services providers, the requirement to obtain a banking licence would apply then. This should reduce concerns of the provision of access to a national bank clearing system without a full banking licence, leading to 'unfair competition' from operators of mobile payment systems.

c. Regulatory setup

It is important to clarify the regulatory setup, as the players may view the lack of regulatory oversight as an obstacle to the development of mobile payments. Since mobile payments represent financial instruments, it is natural that the banking regulators (central banks in particular) should conduct most of the oversight activity. Indeed, this is what has happened in most countries. However, the presence of a central bank is neither a necessary nor a sufficient condition for the developing of mobile payment platforms.

In Somaliland, for instance, there is no formal banking infrastructure and no internationally recognised banks operate there. However, the presence of a strong mobile operator, Telesom, with 1 million mobile connections and about 85% market share, allowed to develop the mobile money ecosystem around Telesom ZAAD. Key commercial decisions of Telesom were to make the service free, and to utilise its own distribution network and not to recruit external agents. The lack of a developed financial regulation also induced Telesom to implement forms of self-regulation in order to get financial credibility, such as identifying and implementing customer due diligence procedures. Apart from the no-fee business model and internal distribution network, another difference in Telesom's approach is its commitment to salary payments and merchant payments. Telesom has created a new model for mobile money whereby customers are encouraged to keep money in the system rather than cashing it out. Given the dominant position in the mobile market, there is now the reasonable possibility that Telesom will start charging customers to use the service – this is where an ex post approach to regulation, as typically done by competition authorities or by telecoms regulators, will be needed to monitor the developments of the market.

Another telling story comes from Zimbabwe. The impact of hyperinflation on consumer trust in Zimbabwe has been profound, losing faith especially in financial institutions. Yet, with 8 million subscribers and 70% GSM market share, the mobile operator Econet has a reach many times greater than the formal financial sector and a high level of consumer trust: EcoCash is now the primary way people pay for goods and services. As in the case of

Somaliland, regulators have to ensure now that the dominant position achieved by EcoCash does not stifle competition and innovation, and the absence of formal guidelines is not very helpful, especially for potential entrants.

In Pakistan, while Telenor Pakistan had a good position in the mobile landscape (22% market share), it lacked experience in financial services and was not licensed to offer mobile financial services. Regulations for mobile account registration mandated comprehensive know-your-customer procedures, which were cost prohibitive and time consuming. In spite of this bank-led model, Telenor Pakistan decided to move forward with developing mobile financial services by teaming up with Tameer Microfinance Bank Limited, a microfinance bank.

These cases, however, are more the exception rather than the rule. It is more common to find central banks engaged in discussions with the market players and with the telecoms regulator in order to find appropriate solutions. See, for instance, the “test and learn” approach followed by the Central Bank of Tanzania (see Box 6 below). The situation to be avoided is one which is too bank-centric, which may overregulate the requirements for licences to be awarded, and may retard the adoption of mobile payment systems. In Box 4 we already pointed out that Indonesia had initially adopted stringent regulations that were simply too costly for MNOs to build agent networks. As new, more flexible, regulations were implemented by the central bank, mobile payments took up. Other examples include streamlined branch regulations that permit banks to manage differentiated service models. In general, it is a good advice to avoid burdening with unnecessary provisions, and to allow a class of non-bank e-money issuers authorized to raise deposits and process payments.

Box 6: The “test and learn” approach in Tanzania

The banking regulator followed a “test and learn” approach, anticipating that a developing market requires a corresponding evolution of industry engagement and regulation. In 2006, Tanzania amended the Bank of Tanzania Act to give the Central Bank (BOT) powers to oversee and regulate non-bank entities in offering payment services. In 2007, it issued Guidelines for Electronic Payment Schemes, which were used to allow MNOs to offer payment services. A great deal of cooperation was sought from the start from the Tanzania Communications Regulatory Authority (TCRA) as the regulatory counterpart of the MNOs. For example, since MNOs traditionally fall under the purview of the TCRA, the draft regulations for mobile financial services make note of the licensing requirements for mobile money as a value-added service. From the beginning, MNOs were required to partner with banks to receive a “letter of no objection”, which enabled the BOT to ensure that consumer funds are protected in the banking system backed with a 100% liquidity requirement. In 2010, the BOT visited the Philippines to learn how the Bangko Sentral ng Pilipinas established enabling regulation for banks and non-banks to implement mobile money deployments. The BOT released new regulations in 2012 which allowed for “non-bank based models”, ensuring that non-banks, such as MNOs, could continue to receive no objection letters to act as mobile payments service providers.

In Sri Lanka, mobile banking services were already launched in 2007. The regulatory framework required customers to have a bank account to sign up for the service. By March 2012, there were just above 10,000 customers of mobile payments in Sri Lanka. The regulatory framework for mobile money then opened the market to both bank and non-bank providers. This marked a shift, and eZ Cash, a new mobile money service, signed up over 1 million customers in just one year. eZ Cash is operated by Dialog, the leading MNO (with about one third market share), that was awarded a licence to operate as a payment services provider following revisions to the central bank's regulations. Therefore, building an inclusive digital financial system requires a level playing field where both banks and non-banks, particularly MNOs, can provide mobile money services. Because the regulator had initially only allowed a bank-led model, Dialog was not able to make the right level of investment in the product and bring it to scale. Also, requiring customers to have a bank account – and imposing burdensome know-your-customer requirements - did not encourage people to sign up.

d. Ex-ante versus ex-post regulation

As we have discussed so far, for an emerging technology such as mobile money, a phase of experimentation by market forces is crucial: firms need to experiment different modes of cooperation (for instance from “light” to “full”, as discussed in Section 2.e), different business models (e.g., the freemium model for insure services – see Box 2), and so forth. This suggests to let the competition “for the market” take place, and therefore to limit ex-ante regulation to a minimum.

In particular, as we have already argued, regulation of entry should not be too stringent, otherwise the market might not just take off, and competition for the market will be limited. Interoperability issues should also be dealt with both ex ante and ex post regulation. Ex ante intervention should aim at avoiding that a dominant mobile money provider creates high barriers to interoperability, for example in terms of technology choices. More specific interventions, for example caps on off-net fees, should possibly only be implemented once networks have matured. Finally, if mobile money platforms rely on clearance systems and banks, ex ante regulation (e.g., access terms to clearance systems) should ensure that banks do not prevent or delay the development of these platforms.

Generally speaking, an ex ante approach involves the regulator anticipating that adverse effects will flow from particular types of behavior, and seeking to restrict the ability of a firm to engage in such behavior before it occurs. The benefits of regulatory certainty can be lost in economic contexts that are subject to significant developments over time. Enforcement and compliance can also become ‘rules-based’ in ways that detract from achievement of the overall purposes of regulation. Taking account of these complicating factors, the sorts of contexts in which ex ante regulation tends to work better include narrowly defined issues, so that the problem of different effects in different contingencies is greatly reduced, or when the relevant harms that might occur are potentially very substantial and difficult to reverse.

An advantage of the ex post approach is instead that the quality of information about the effects of market conduct is generally significantly better after that conduct has occurred, which should result in more appropriate and proportionate interventions. However, the flexibility and regulatory discretion that this implies can create uncertainty on the part of the firms subject to regulation as to how particular standards will be applied in practice. The chief worry here is about the chilling effects of regulatory uncertainty on investment and innovation, because such decisions can involve large and irreversible commitments of resources. The effective functioning of ex post approaches, which potentially brings lower enforcement and compliance costs and, more crucially, greater flexibility and adaptability, depends upon establishing a reasonable level of trust between regulators and regulated firms. This draws attention to the significance of the informal aspects of the institutional architecture of markets, of which reputation and trust are aspects.

Given the dynamic nature of mobile payment platforms, we envisage that ex-ante regulation should be the exception rather than the rule, and should emerge when market conditions are rather extreme, and also when market failures are otherwise very likely to happen. For instance, the case for ex-ante regulation could be stronger in the presence of a very large incumbent MNO and, additionally, in the presence of very high barriers to entry for other competitors. In this case, the incumbency position is not likely to have been earned by the incumbent MNO, but still other players would find it very difficult to challenge the existing dominant position. In a situation like this, the relevant authorities might want to regulate, for instance, the off-net fees for money transfers at the very onset. Similarly, some ex-ante “margin squeeze” tests might be adopted in order to prevent the incumbent from leveraging its dominant position from one market (e.g., mobile telecoms) into another one (e.g., mobile payments). Yet, cases like this are quite rare and must be proven before introducing rules that can hinder the development of new markets.

To sum up, one could view the appropriate regulation of mobile money platform as a form of “ladder to banking” for non-banks (e.g., MNOs). This ladder should avoid too stringent regulations from the outset (e.g., requiring a bank license to entrants), otherwise there will be no take-off. The different rungs on this “ladder to banking” should be designed so that mobile money platforms evolve from simple P2P transfer services to complete (mobile) financial service providers (e.g., offering insurance, credit, etc.). This evolution may require access to different levels of bank infrastructures (e.g., access to clearing system, ATM network, etc.) at different stages of development of non-banks. Of course, regulations will follow this progression too – as MNOs enter lending, for instance, they should be subject to the same capital and other prudential requirements as applied to banks.

5. Conclusions: creating the right ecosystem

Can mobile money really be the catalyst for innovation in financial services, leading to further financial inclusion? The answer is yes, in principle: given the dense network of transaction points, costs are much reduced compared to the traditional financial sector. Even more importantly, once clients are brought into the financial system, they can get platform

access to a whole new set of services and delivery models. Mobile money can drive financial inclusion, that is, the possibility of providers offering savings, credit, insurance and other products to the poor at low cost: the first key obstacle here is scale, as networks and platforms require scale to have impact. Innovations can come from the development of new products that operate through the mobile money channel: savings and insurance seem to have particular good potential as they involve frequent small-value transactions that would be expensive to conduct through normal retail channels. However, this also comes with the problem that building trust and maintaining a relationship with customers is difficult, especially when there are less face-to-face contacts.

Even Kenya, perhaps “the” success story of mobile payments so far, comes with caveats. Some authors argue there is an innovation gap: M-PESA does not innovate any more. In economics terms, there may be a risk of a “replacement effect”: if M-PESA further innovates, it basically replaces itself as the main player in the market. Hence, its incentives to innovate are reduced compared to a smaller player that would strive to become dominant. Respondents to surveys conducted by Kendall et al. (2011), argue that M-PESA fees may still be too high to build an interesting ecosystem in Kenya, perhaps an indication that indeed M-PESA is exercising market power. More tellingly, M-PESA has no real API (Application Programming Interface) to speak of, so that integrating with the mobile money platform is difficult. APIs allow different software applications to interface with one another, and M-PESA so far has not devoted much attention to APIs. Poor APIs mean large integration costs, which is problematic especially for smaller innovators with limited in-house software development capability.

The M-PESA example highlights that large initial investments and/or progress within one technological path can later on limit the prospects for further innovation. When an existing mobile payment platform operates at a relatively large scale, its incentives to upgrade or expand its service are reduced compared to a new player, due the “replacement effect” mentioned above. This can be problematic in particular if the payment platform cannot meet all consumers’ needs in its present design and would have to be upgraded. The over-the-counter model in Pakistan (Box 7) shows an example where a payment platform is locked in in an inefficient design, and the incentives to switch to a more efficient distribution system are low. This example suggests that a model where the payment platform is developed in successful steps may not be effective, unless the platform is able to build a strong reputation or market experience which would later on compensate for the replacement effect.

Box 7: The over-the-counter (OTC) model in Pakistan

In Pakistan, Easypaisa was launched by Telenor Pakistan, a MNO, and Tameer Bank, a microfinance bank. Using the mobile account model would mean their total addressable market would exclude about 40 million non-Telenor Pakistan GSM subscribers (Telenor Pakistan had less than one quarter of the total market), as well as those with no mobile subscription, all of whom were potential mobile money customers. They decided to launch Easypaisa as an over-the-counter (OTC) service, whereby all transactions were agent assisted and no registration was required, relying exclusively on its existing GSM distribution structure. The plan was to start with OTC and, as customers came to understand the benefits of mobile money, active users would migrate to the electronic wallet. This has not yet happened, however. Here, we can see both the pros and cons of this alternative entry model. Given the regulatory constraints, it is unlikely that mobile money would have succeeded without OTC. Cumbersome registration procedures across the distribution network would likely have resulted in poor transaction volumes. This would have discouraged agent investment. Given the comprehensive requirements typical of a bank-led model, and a telecommunications landscape without a dominant MNO, the OTC model was possibly the most agile way to launch and expand mobile money in Pakistan. Having achieved this, it is now difficult to extend the product offerings. With the OTC model, products are limited to one-time transactional financial services, such as a bill payment or money transfer. Savings and credit, which require recurring transactions, cannot be seamlessly facilitated through OTC. But as the infrastructure is already in place, the incentives to change again the distribution system are diminished.

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Annex

Lessons from developed countries: The US experience

Crowe et al. (2010) identify the main reasons for the lack of adoption of mobile payments in the United States. Crowe et al. focus on contactless and NFC technologies, though the points they raise are valid more generally for other mobile payment technologies.

Most of the barriers relate to the following concepts: costs, substitutes, network effects, negotiation costs, appropriability, and regulatory uncertainty. We revise their approach below, highlighting the similarities and differences that may arise in developing countries.

Adoption costs

The pecuniary costs of investing in a new technology are crucial to considering its diffusion. To accept mobile payments, merchants must install contactless readers at each terminal/cash register. Uncertainty about which standard will emerge as dominant appears to be deterring merchants from investing in this technology. Moreover, merchants would have to pay merchant fees for each contactless mobile payment transaction, while no such fees are imposed on the cash transactions they would replace. Consumers would also have to replace or upgrade their mobile phones with phones equipped with a designated chip to be able to conduct mobile payments at physical retail locations; the availability of contactless-enabled phones is still limited.

Relevance for developing countries: very high, especially given the reduced purchasing power of many individuals. Obviously, this negative factor will be reduced in case subsidies are given to merchants, consumers, or both. Adoption costs are also technology-specific. For example, if the mobile payment platform uses a technology compatible with consumers' existing phones (e.g., USSD), adoption costs for consumers are significantly lower.

Demand substitutes

In considering whether a new technology will be or should be adopted, it is important to consider the available substitutes for that technology. For contactless payments, the existing card-based payments infrastructure provides a close substitute, particularly in the short term. The vast majority of US consumers carry and use credit and debit cards, also for small purchases, thus reducing consumers' demand for payment method alternatives. Cash is used much less frequently in the United States than in countries where mobile payments are significantly more successful.

Relevance for developing factors: low; actually the absence of close substitutes in many developing countries is a key factor that makes mobile payment systems potentially successful. The closest substitute for mobile money in developing countries is actually cash. Cash is fully interoperable and widely available, and the mobile platform has to provide a better value for

consumers to join. However, as we outlined in the report, cash is also a costly and risky payment instrument, which gives room for a mobile payment platform to succeed.

Network effects and two-sided markets

We have already discussed extensively this factor in Section 3.a. There is a “chicken-and-egg” problem, where neither side (e.g., consumers/merchants) is willing to invest until the other side has, even if both would benefit from joint investment. With payment systems in the past, this adoption problem was often solved by the payment companies offering incentives to adopt either to merchants or to consumers. The “chicken-and-egg” problem is especially difficult to overcome in the case of mobile payments because multiple parties are involved: mobile carriers, banks, handset manufacturers, chipmakers, merchants, and consumers, making the resolution much more complex.

Relevance for developing countries: high. This characteristic is endemic to payment platforms. Developing countries can benefit from prior experiences in order to reduce its relevance and impediment to adoption. Also, if subsidies are used, it would make sense to focus them on one side of the market alone, as it could solve the coordination problem. This solution is efficient from an economics point of view, though it may create equity issues. In the specific case of mobile money platforms, the mobile network operator may already have a large customer base for telephony services; in this case, the platform’s problem is not to convince consumers to join, but rather to adopt a new service, namely, mobile money.

Negotiation costs

Mobile payments require multiple industry participants to work together. Difficulty may arise because the industry is made up of many small participants, because they are heterogeneous and have very different preferences, because of a culture of distrust, or because of legal restrictions. Industry-wide agreements on technology standards and business policies are very difficult to coordinate and negotiate to reach consensus. Bilateral negotiations between a single bank and a single carrier are much easier, but the market share of customers having accounts with both the bank and the carrier is likely to be small, lowering the impact of any resulting agreement. Vertical coordination is also made difficult because of the number of parties involved in each transaction: a mobile carrier, a handset manufacturer, a card association, a mobile software vendor, a bank, a merchant, and a consumer. The parties would have to agree on who is responsible for verifying the consumer’s identity, resolving disputes, handling customer service, etc. A bank might worry about reputational risk if a payment failed to be executed because of an issue involving a carrier. Carriers have never been involved in financial services and would have to tackle a host of new legal and regulatory issues. Coordination problems may be exacerbated by the possibility that the significant players want to “own” the relationship with the customer and the rich set of information that mobile payment services could yield. This would also raise privacy and consumer protection concerns.

Relevance for developing countries: very high, as again this problem is endemic to an industry that involves several players. Developing countries actually benefit from many international lessons that can be drawn from previous experiences, which can be used to reduce or at least anticipate coordination problems. In some cases, they can also paradoxically gain from relatively concentrated market structures in mobile and banking, as it would be clear who has to negotiate with whom. This assumes, however, that there is a sound legal system in place – without it, it is not expected that privately led negotiations among players will be successful.

Appropriability or public good nature of industry standards

A free-riding problem arises if investments have a public good quality, that is, if they benefit many industry participants, or if the benefits are realized in the long term or in other industries. This issue is particularly important in the case of open industry standards. Because participants expect an industry standard to be publicly available, any private party investing in development of the mobile payments standard helps other potential adopters. Thus, there is an issue with appropriability. Are open, industry-wide standards necessary? Probably yes, as it appears difficult to achieve mass adoption of mobile payments without involving all stakeholders. One can imagine alternatives. For instance, mobile carriers could offer payment services without the involvement of banks, perhaps by limiting consumers to pre-pay accounts or by offering consumer credit themselves. An important issue in the adoption of standards is the issue of competition and substitutability. If suppliers conform to the same industry standard, they are naturally limited in their ability to differentiate themselves from one another. Thus, suppliers face close substitutes, increased competition, and reduced incentives to invest in the first place.

Relevance for developing countries: moderate. Developing countries are too small to introduce or sponsor their own standards. Hence, they will rely on industry-wide standards, again using best practices from abroad. Furthermore, the objectives of financial inclusion call for using technologies that are available on all phones, and hence, mature technologies. A potential caveat is that in the longer run, mobile payment platforms in developing countries may wish to upgrade to more advanced technologies (e.g., NFC), potentially protected by patents. In this case, high levels of royalties, leading to too high phone prices for developing countries, might be a barrier to upgrade.

Lack of clear regulatory oversight and regulations

Providing mobile payments in the US involves entities in several different industries currently supervised by different agencies: financial institutions are regulated by the Federal Deposit Insurance Corporation (FDIC), the Office of the Comptroller of the Currency (OCC), the Federal Reserve, and the National Credit Union Administration (NCUA); mobile carriers are regulated by the Federal Communications Commission (FCC); the Federal Trade Commission oversees competition more generally. The use of a mobile device to make payments and purchases falls outside the regulatory boundaries defined by each agency. For example, FCC regulation does not address mobile payments or financial transactions

specifically for carriers. Financial regulators do not currently distinguish between risks stemming from payments initiated via a mobile phone and those stemming from any other payment method. An example of a confusing regulatory issue is the oversight of Obopay. A consumer can access Obopay either through a bank website or through an application on his mobile phone. The service is covered by banking regulations in the first case, but not in the second, although the service is exactly the same. In the second case, the consumer is protected only by the terms and conditions established by the service provider. Many private sector stakeholders cited two major obstacles to their participation: lack of clarity as to who will regulate mobile payments and how these payments will be regulated, and lack of guidance on which current regulations cover mobile payments.

Relevance for developing countries: very high. This is key. In most countries, mobile payments represent a grey area in existing regulations. In some countries, regulation has been adapted to account for and encourage the development of mobile money platforms. Mobile money platforms also lie at the edge of telecommunications and payments, in particular when they are “MNO-centric”; in this case, some coordination between the telecommunications sector regulator and the authority in charge of payments oversight (e.g., the central bank) might be warranted.