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BEYOND MULTI-SIDED MARKETS: MANAGING THE EVOLUTION OF MOBILE PAYMENT AND FINANCIAL SERVICE PLATFORMS

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Beyond multi-sided markets: Managing the evolution of mobile payment and financial service platforms

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Abstract:
The number of digital platforms and platform ecosystems have been growing rapidly the last couple of decades and so has their attention across a broad range of research fields. Mobile payment or financial service platforms (MFSs) represent one important category of such platforms which has also become remarkably popular and widely diffused in developing countries and emerging markets. MFS platforms is increasingly seen as an opportunity for poorer members om the populations to "leapfrog" from their current situation where they are not using any ordinary bank or financial service to become "financially included." Financial inclusion requires MFSs that go far beyond the peer-to-peer payment services being mostly focused so far. They need to provide a lot of appropriate services to a wide range of different user groups. The different services will support different kind of transactions between members of different user groups, implying that each service will have its specific network effects. At the same time, each user will use several services. All together then, this creates a complex constellation of overlapping and connected networks and a correspondingly complex network effects propagating across the networks. Successful financial inclusion requires, then, that MFS providers are able to successfully develop a platform offering the services required at the same time as they are able to cope successfully with the myriad of network effects involved. We will address this issue through a case study of the Easypaisa service in Pakistan. The key element of a successful strategy we call *cultivation of financial literacy.*

1. Introduction

The number of digital platforms and platform ecosystems have been growing rapidly the last couple of decades and so has their attention across a broad range of research fields. The paradigm examples of such platforms are iPhone/iOs, Android, Airbnb, Uber, and Alibaba. The growing popularity of platforms has taken place in parallel with a similar growth in popularity of mobile phones and many platforms are primarily accessed through such devices. Mobile payment or financial service platforms giving users access to various payment and financial services through a mobile phone and represent one important category of popular platforms. Such platforms are established by a wide range of organizations like major IT companies like Apple and Google, mobile network operators (MNOs), and banks, and they have contributed to substantial innovations related to payment and financial services and a quite dramatic change of the overall industry providing such services.

Mobile financial service platforms (MFSs) have become remarkably popular and widely diffused in developing countries and emerging markets, which we in this paper will refer to as the Global South,[1] compared to the speed of adoption of other new and advanced technologies in this domain. And the platforms' impact on the transformation of the financial industry and use of financial services are even more profound. Safaricom's M-Pesa service, launched in Kenya in 2007, is often pointed to as the "trailblazer" (Foster and Heeks, 2013; Oborn, et al., 2019), triggering a huge number of other actors to follow. By 2015, at least 271 services were in operations in 93 countries in the Global South (GSMA, 2015).

Most research on MFS platforms in the Global South as well as on platforms in general has focused on the role of network effects and the theory of multi-sided markets in the growth of the platforms' user base. Much of this research has been motivated by an interest in understanding and describing how to establish a successful platform business. We have experienced, however, that successful platforms over the years have evolved and changed quite dramatically from its original concept. Facebook, for instance, was launched as an extremely simple chat-like service, but has grown into something dramatically different, not only in number of users, but also in the number of services it provides and the role it is playing as a global infrastructure for interpersonal contact, distribution of news from media organizations, not to mention as a marketing channel. Some research on the evolution of platforms has, of course, emerged, but more research into their evolution is indeed much in demand. One example is the research of Alaimo et al. (2020) on the transformation of TripAdvisor from a search engine giving users access to information about the ranking of restaurants and hotels based on existing databases storing such information, to a social media platform based on users' own ranking of hotels and restaurant, and to a platform offering end-2-end services in terms of booking as well as payment services.

The success of M-Pesa and other MFS platforms in the Global South has been an eye-opener not only for MNOs, but also for organizations like OECD, the International Monetary Fund (IMF) and the World Bank, as well as local governments in developing countries (State Bank of Pakistan, 2015; Khadija et al., 2012; OECD, 2013). These organization see MFS platforms as an opportunity for poorer members om the populations to "leapfrog" from their current situation where they are not using any ordinary bank or financial service beyond paying in cash and become "financially included," i.e. opening bank accounts and using all relevant financial services made available to them through mobile phones.

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[1] https://en.wikipedia.org/wiki/Global_South

About 2 billion adults in the Global South are considered financially excluded or unbanked, meaning that they do not have access to basic financial services (The World Bank 2014). However, the majority of the unbanked have access to a mobile phone, hence potentially access to MFSs. That would, it is argued, deliver a broad range of benefits to the individual citizens as well as the society or country as a whole (State Bank of Pakistan, 2015; Khadija et al. 2012; OECD, 2013). Individuals more easily carry out their financial transactions and the risks of being robbed will decrease; when they open a bank account and save money, they can easier get credit to develop their business, which would contribute to the economic development of the country, etc. When salaries and pension payments are made through MFSs, financial transparency is increased making it hard for recipients to evade paying taxes (CGAP, 2015; Kahn, 2016). In the largely cash based economies of the Global South, cash management (distribution) is very resource demanding. The World Bank estimates that efficiency created by government-to-person financial payments using MFSs can save India one percent of its GDP, or about USD 20 billion (Wall Street Journal, 2018). Further, MFSs represents important new business opportunities for mobile phone operations and other members of the emerging Fintech industry.

To "bank the unbanked" and obtain the envisioned benefits of financial inclusion for the individual as well as countries or societies as a whole, requires MFSs that go far beyond the peer-to-peer payment services which are provided initially by all MFSs and which research on MFSs has mostly focused on. They need to provide a lot of appropriate services to a wide range of different user groups like, retailers and various small industries – in particular to those in poor rural districts; services for employers and government agencies to pay salary, pensions and social benefits; services for paying bills to utilities; etc.

A challenge common for all platforms and infrastructural services is how to cope with network effects, i.e. the fact that the benefits a service deliver to an individual depend on the number of others using it. The different services required for achieving financial inclusion will support different kind of transactions between members of different user groups, implying that each service will have its specific network effects. At the same time, each user will use several services. All together then, this creates a complex constellation of overlapping and connected networks and a correspondingly complex network effects propagating across the networks. Successful financial inclusion requires, then, that MFS providers are able to successfully develop a platform offering the services required at the same time as they are able to cope successfully with the myriad of network effects involved.

May be the most critical and hardest challenge that must be overcome to achieve financial inclusion relates to the high degree of illiteracy in general and specifically what is called "financial literacy," i.e. lack of knowledge about financial services, in particular. Financial inclusion means, then, that also the financially illiterate has to adopt and use an MFS platform to carry out their financial transaction. To make that happen, MPS providers need to develop services that are as easy as possible to learn to operate and understand how to use it at the same time as they need to offer services to the financially illiterate are able to use at their current level of financial literacy at the same time as such services may help increase their financial literacy and capabilities to adopt more "sophisticated" services.

For an MFS provider to contribute to financial inclusion and get the economic benefits of this as service provider, it needs to successfully cope with the challenges described above. This brings us to our research question:

What strategies and tactics can an MFS provider adopt to best contribute to "banking the unbanked" and financial inclusion in an emerging economy?

To address this research question, we will analyse the evolution of the Easypaisa service in Pakistan from its launch in 2009 to 2020. During this period, Easypaisa has been growing at a steady speed in terms number of services provided, number of users and user groups enrolled, as well as volume and value of transactions. Together with other MFSs providers in Pakistan Easypaisa is contributing to a process where more and more Pakistani citizens are financially included, but there is still a long way to go before all the envisioned benefits are obtained.

The rest of this paper is structured as follows: in the next section we give an overview of related research. Then we present our theoretical framework followed our research methodology. In section five we give an overview of our case and present relevant contextual information about Pakistan. In section six we present our findings and analysis, while the final section presents a concluding discussion.

2. Related research

The growth in numbers and popularity of digital platforms - not to speak about the stock value of the successful platform companies – has triggered a similar growth in research on these phenomena across many disciplines. Most research has focused on the benefits of platforms delivered to its users compared to "traditional" organizations and business models – what van Alstyne et al. (2016) call pipeline companies - on the one hand and challenges and strategies for successfully launching a platform and managing the growth of its user base, see for instance (Rochet and Tirole, 2003; Rochet J.-C. Tirole, 2006; Evans and Schmalensee, 2016; Parker et al., 2016). Focussed issues in managing platform growth have been challenges related to network effects and platforms as multi-sided markets. One issue considered important in this respect has been the tension between openness to attract as many users and third parties (complementors) on the one hand and the need for control on the other (see for instance (Ondrus et al., 2015).

Over the years, as platforms established early have become older and changed from its early versions, research has followed and focussed how platforms has evolved beyond attracting continuously more users (see for instance (Alaimo et al. 2020). So far, however, this research includes mostly descriptions of how individual platforms has evolved and systematic inquiries into the "logic" behind platform, or platform ecosystem, evolution is still missing. (See (Asadullah et al. 2018) for an updated literature review and (Staykova and Damsgaard 2020) for an exhaustive account of the different views on platform evolution).

2.1 Mobile payment/financial services platforms

MFS platforms represent a popular category of digital platforms. They differ in many ways from those most frequently described in the research literature like Facebook, iPhone/iOs, Android, Alibaba and AirBnB which have mostly been developed by start-up companies.

Banking and financial services are heavy regulated at the national level, accordingly MFS platforms are established as separate platforms in each country and they are integrated into and built upon both existing payment infrastructure (i.e. banks' back office systems) as well as mobile phone infrastructures. Many MFS platforms are established and controlled by various constellations of banks and MNOs while other platforms are provided by incumbent actors having their origin in other sectors and developed as add-ons to different exiting services and technologies, like ApplePay (add-on to iPhone), Google Pay Send (add-on to

Google's platform ecosystem), and AliPay (add-on to AliBaba's on-line shopping platform) (Wittek, 2016).

The existence of several services in the same market creates a need for standards, and various efforts aiming to settle relevant standards have been launched. However, with the diverging interests of the stakeholders and the rapid changing technological as well as the competitive landscape, many collaborative constellations have failed and collapsed (Ozcan and Santos, 2015; Stykova and Damsgaard, 2016, 2020; de Reuver et. al 2015; Rukanova, et al. 2017). In some cases, one of the participants in a failed consortium has picked the remaining "embers out of the ashes" and established successful MFSs on their own (Stykova and Damsgaard, 2016; Rukanova et.al 2017). In other cases, after successful "ignition" of an MFS established by one actor (typically a bank), others are invited to join and the MFS is established as an independent company owned cooperatively. This happened in Norway, for instance, where the largest bank, DNB, established a service in-house, and as its was getting momentum, DNB transferred the service to a new shareholding company and invited other banks to join and 106 did so (more or less all Norwegian banks). An important rationale behind this was to strengthen the service position in the competition they expected from global actors like Google and Apple.

2.2 Mobile payment services in developing countries
Digital platforms and platform ecosystem have, not surprisingly, also become popular in the Global South where such technologies are seen as holding a great potential for the economies and societies in the global south (Bonina et al. 2021). This is in particular true for MFS platforms (Foster and Heeks, 2013; Oborn et al. 2019; Wenner et. al., 2018). MFSs in the Global South have, of course, many similarities with such services in the Global North, in particular regarding the core functions the services are offering. There are, however, significant differences as well. While MFSs in the global North are mostly provided and controlled by banks, in the global South MNOs are the dominant service providers. This can be explained by the fact that in the Global South, the penetration of mobile phones is very high while only smaller parts of the population have a bank account. This implies that MNOs have a significantly closer relationship to the citizens, and, accordingly, they can more easily get in contact with citizens and offer them their MFS. There are also significant differences when it comes to the benefits MFSs can deliver to their users. In the Global North, MFSs represent an alternative to the use of Internet banking and credit cards, while in the Global South, MFSs represent for the "unbanked" an alternative to cash-based payment services and make financial services more attractive and easier to adopt that ordinary banking services. The high percentage of "unbanked" citizens in the South implies that the potential benefits of wide adoption of MFSs to individuals as well as society at large are much higher in the Global South, However, illiteracy also raises some tough challenges to achieve these benefits. Finally, the potential benefits of MFSs in the Global South make such services objects of interest for a range of actors not involved in this domain on the Global North. This includes national governments, international organizations like the World Bank, the International Monetary Fund, and various UN organizations and NGOs.

The number of MFSs has grown steadily for many years and had by 2015 reached 271 services in 93 countries, here defined as services for the underserved, i.e. without bank accounts, providing access using a basic mobile phone (GSMA, 2015). The Sub-Saharan continent in Africa dominates with roughly 50% the services in total (GSMA, 2016). The large majority of deployed services are payment services. This rapid growth in number and use of MFSs in the Global South has, not surprisingly, also triggered the curiosity of

researchers - in particular research aiming at identifying the factors explaining the success of M-Pesa in Kenya while its transfer to for instance Tanzania was much less successful (Foster and Heeks, 2013; Oborn et. al, 2019; Wenner et. al., 2018; Kingiri and Fu, 2020)

Evans and Pirchio (2015) have conducted a comparative study of MPSs in 22 developing countries. Their analysis builds on the concepts of multi-sided markets and network effects, assuming platforms typically grow slowly at first up to a certain point ("critical mass") where they "ignite" and begin to grow explosively. The most robust finding from the study was that heavy regulation, insisting that banks play a central role in the schemes, together with burdensome know-your-customer (KYC) procedures and restrictions on who could operate as an agent, is heavily impeding rapid adoption and diffusion of mobile money schemes. Further, they found that ignition and explosive growth occurs quickly or not at all. Research on the slow diffusion of MFSs in India found that critical factors for adoption were ownership of SIM card, income and ownerships of a bank account, awareness of mobile money services, and location of residence (Potnis et al. 2020).

While most research on MFS's has concentrated on the basic services for money transfer between individuals, a comprehensive literature review that includes 64 different MFSs from around the world identified a huge variety of services offered, synthesized into 12 different organizational models (Wenner et. al., 2018).

So far, it is hard to find research on "full scale" financial inclusion of the "unbanked" with (Senyo and Karanaasios, 2020) and (Babu, et al., 2020) as exceptions. Based on a case study of an MFS in Bangladesh, Babu et. al. (2020) argue that financial inclusion goes beyond technological innovations and the diffusion of these – it is largely about *social innovation*. Social innovation has been defined from various perspectives such as public goods, service orientation, institutional change, social change, although at the core of it, "remains the enhancement of quality of lifestyle of people involved" (ibid., p. 13). Social innovations are system-changing new ideas that resolve existing social, cultural, economic and environmental challenges and consequently result in permanent impact on the perceptions and behaviours of people in certain are. In the case studies, Babu et al. (2020) found that social innovation related to achieving financial inclusion by means of MFSs, strategic collaboration between multiple organizations, including banks and MNOs but also other business and public organizations was a critical issue.

This paper contributes with additional insight into the management of mobile payment platforms assuming that all users being equal and that MFSs ignites when reaching critical mass. The paper also goes beyond current research on multi-sided markets and network effects studying a more complex context with strategies that addresses the variety among users (financial illiterate) increasing their absorptive capacity and how the different services create different, but connected and interdependent, multi-sided markets.

3. Theoretical framework
We will here present our theoretical framework. Like most research on platforms and networking technologies, we will draw upon network theory. In its simplest, and most widely adopted, form network theory describes the evolution of a network of identical elements or actors. This assumption is relaxed in the theory of multi-sided markets which has become very popular in research on digital platforms. This theory describes the evolution of a network of two or more different but mutually dependent groups of actors, a typical example buyers and sellers operating on an on-line marketplace (Rochet and Tirol 2003). But the theory of

multi-sided market does not consider variety among individual members of the groups, or sides, involved either. This issue is, however, focussed by Schelling (1978) and Granovetter (1983). They analyse the impact of variety of individual preferences on the evolution of processes related to a group of individuals like, for instance, the diffusions of technologies. All three theories mention so far are criticized by Latour (1987) for assuming that processes, like the diffusion of new technologies, unfold by themselves. He is presenting the concept of translations from Actor-Network theory as an alternative to that of diffusion. This concept put emphasis on the role of human agency in making such processes unfold. We combine these theories, or approaches, to analyse how network effects (and same- and cross-side effects in a multi-sided market), the variety of and within user groups, and the service provider's strategy and actions interact and in combination explain Easypaisa's evolution.

3.1 Network and multi-sided-markets
Platforms, as well as other networked or infrastructural technologies, have been extensively analysed based on network theory (Shapiro and Varian, 1999). The maybe most crucial aspect of such technologies is that the attractiveness, or power, of a network is largely determined by its size. In the case of network technologies, like email, telephones, or social media platforms, the value of the technology for each user increases with the total number of users that are using the technology (the number of people a phone owner can talk to or the number of users one can communicate with using email) and not primarily related to the functions they offer the users. As the number of users grows, the technology tends to get momentum and it starts growing through a self-reinforcing and path-dependent process (Arthur, 1994). The network continues to grow "by itself"; the more users that have adopted and are using it, the higher the use value of the technology is, and the more additional users will adopt the technology, and so on.
This fact tells us that it is hard to get started in the sense that no user wants to be the first one. Everybody wants to wait until – or to see if – others are adopting the technology. Accordingly, it is most rational for each individual not to adopt a technology before a significant number of others have done so – the diffusion process will gain momentum, or "ignite," after a certain number of users, a "critical mass" (or critical number would be more precise) has adopted the technology (Evans and Schmalensee, 2016).

"Classical" network theory as presented above, including the critical mass model, is very simple – which makes it very powerful. But in the case of platforms important weaknesses have been identified. The theory, and the critical mass model, is based on the assumptions that all users, or members of a network, are equal and that only their number counts. This is to a large extent the case for networking technologies like telephone and email – but not for all platforms. As first pointed out by Rochet and Tirole (2003), platform users often belong to different groups that are using the platform for different purposes, and that the relations between the groups have significant impact on the adoption process of the platform. Typical examples are on-line market places, paradigmatic examples being Uber and Airbnb. Such platforms are used by two distinct groups: sellers and buyers or service providers and service consumers. In such cases, the attractiveness of a platform for a potential user depends not on the total number of users, but primarily of the number of users belonging to the "other" group or side.

The theory of multi-sided markets does not focus just on network effects, but rather on cross- and same-side effect – positive as well as negative. In the case of an on-line marketplace with sellers and buyers, when a new seller adopts the platform for offering its products, this may

generate same-side effects having implications for other seller and cross-side effects having implications for buyers.

3.2 Variety among users and user groups, their preferences, and absorptive capacity.
Schelling (1978) and Granovetter (1983) have also (independently) criticized the "critical mass" model. They are both pointing to the fact that individual users are also different beyond belonging to different groups. They focus on individuals' preferences related to the adoption of technologies as well as other phenomena where groups of individuals are related in one way or another. They argue that in many cases our preferences are not static and given, but dependent upon other people's actions. This implies that the unfolding of various processes, like adoption of technologies, depend on how individual preferences are distributed among the members of a group or community.

To illustrate this Granovetter and Schelling describe well-known phenomena like "dying seminars" and pedestrians' behaviour when walking across a street. In the first case, a group of students or scholars agrees to start a weekly seminar on a given topic. The first meeting gathers many interested participants, the next a little less, and for each week the number of participants decreases until the few left agree that it is better closing the whole seminar. In cases like these, small changes in the distribution of preferences can have tremendous effects on the outcome. To illustrate this Granovetter (1983) constructed an example: Let us assume that twenty people are waiting for green light to cross a street. Further, let's assume that among these there is one that crosses the street on red independent of any others, provided there are no cars. There is also one that walk across the street if there is at least one other doing so, one that walk across if there are at least two, and so on, up to the last one which walks across if at least 19 others do so. In this case, all individuals will cross the street. However, if we make a minimal change in the individual preferences so that one of this crowd, no. x, requires that x rather than x-1 persons must cross the street before she will follow, the process will stop at this position. x-1 people will walk, no. x doesn't walk and consequently the rest of the group will wait for green light. If this individual (no. x) is the first one, none will walk across.

The implication of this model is that rather than "buying" (subsidising) users until critical mass is reached, one has to identify the users being willing to adopt the technology first, then those willing to adopt it as second, and so one. But this is not as simple as it seems, since users' preferences regarding technologies are not given, but may change. They depend on many factors, among them the design of the specific technologies. Accordingly, building a large network requires partly identifying user preferences and then "sorting" the users according to this, and partly shaping user preferences – in particular by the design of the technological solutions.

Granovetter and Schelling's work has some relations to Roger's (1962) classical studies of the diffusion of innovations. He found that most diffusion followed a general patter: first a technology is adopted by what he called innovators, then early adopters followed by early majority, late majority, and finally laggards. What distinguished the groups are typically age, social class, financial resources, knowledge as well as personal preferences regarding for instance giving value to following traditions. Rogers, then, emphasized similarities across adoption process of different technologies, while Granovetter focused on their differences.

What determines which of Roger's categories an individual belongs to can largely be seen as their *absorptive capacity*. The concept of absorptive capacity was defined by Cohen and

Levinthal (1990) as a firm's *"ability to recognize the value of new information, assimilate it, and apply it to commercial ends"* (p. 128). For them, absorptive capacity depends greatly on prior related knowledge and diversity of background. The investments a firm makes into its research and development (R&D) efforts are therefore central to their model of development of absorptive capacity. Further, absorptive capacity is seen as cumulative, meaning that it is easier for a firm to invest on a constant basis in its absorptive capacity than investing punctually. Efforts put to develop absorptive capacity in one period will make it easier to accumulate it in the next one. Absorptive capacity is also said to be a key reason for companies to invest in R&D instead of simply purchasing the results post factum (e.g. patents). The more a firm invests in research and development activities, the more it will be able to fully appreciate the value of new external information. After Cohen and Levinthal's early work on absorptive capacity focusing on firms, the concept has been applied to research also on individual, group and national levels (Zahra and George, 2002).

Cohen and Levinthal (1989, 1990) emphasized the role of R&D for a firm's increase of absorptive capacity. Researchers focusing on the development and evolution of innovative industrial districts (of which Silicon Valley is the paradigm example) have, on the other hand, have identified *knowledge spillovers* as a "critical success factor." Spillovers are a kind of network externality sharing some characteristics with network effects described above. Spillovers are defined as uncompensated benefits that one person's activity provides to another. For instance, the beauty of a homeowner's flower garden is a positive spillover effect upon the neighbours. Knowledge spillovers are present when an innovator develops a new technology from which others may learn to develop similar ones. In industrial districts such knowledge spillovers have been found to be critical to the whole district's innovative (and absorptive) capacity in particular as people moves between companies, bringing the knowledge they have accumulated in one organization to another making this knowledge available in the development of other new technological solutions Gilson (1999), for instance, found that differences in the "legal infrastructure" between Silicon Valley and Route 128 around Boston/Cambridge was a key factor in explaining why Silicon Valley flourished while Route 128 faded away. The legal infrastructure in Route 128 was much more restrictive regarding an individual's possibilities to move freely between firms compared to Silicon Valley.

Spillovers contribute, then, to the growth of both firms' and individuals' absorptive capacity as individuals move between firms and work on the development as well as use of various technologies. We can, accordingly, anticipate that the evolution of MFSs will depend on network effects between different users and user groups, the evolution of the absorptive capacity of the service provider(s) as well as the variety, distribution, and evolution of absorptive capacity among the users.

3.3 Translation or diffusion: the role of agency and design
Actor-Network Theory has been developed to describe and analyse the development and adoption of scientific theories and technological artefacts (Latour, 1999). These processes are seen as a series of translations (hence Actor-Network Theory is also, especially in France, called the Sociology of Translation). Through translation, elements are modified to be enrolled into and aligned with others to form larger networks. Bruno Latour (1987, 1996, 1999) have described translation processes in contrast to dominant models of diffusion of which the network theory, and in particular the concept of critical mass, are paradigm examples. Latour is arguing that the diffusion models are technology deterministic, assuming that the technology diffuses itself – the diffusion process ignites when critical mass is reached.

Latour argues that this is simply wrong – noting diffuses by itself, only when an actor act and makes it diffuse through translations: *"So is there never any respite? Can't the work of creating interest ever be suspended? Can't things be allowed just to go along on their own? Isn't there a day of rest, after all, for innovators? No: for technologies, every day is a working day"* (Latour, 1996), p.89). And further, *".. there are always people moving the objects along but they are not the same people all along"* (Latour, 1987) , p.137-8). So, according to Latour, every time a product or service is adopted, this only happens based on some actors taking action. Such actors might be just users decided to adopt a product or service she has become aware of, it might be someone developing or adapting a product or service to a user needs in some kind of collaboration with a user, or it might be someone working together with a user exploring how an existing product or service may be used in a beneficial way by the user.

The theories mention so far has a focus on humans and their relations. However, assuming that different user groups are different at the same time as individuals within each user group are different, how a product or service is designed will also matter. So, some design features will be attractive for some user groups or individuals, other features for other users. Information infrastructure research has developed strategies for building, i.e. *bootstrapping*, such infrastructures where design issues are taken into account in combination with network effects and the differences among users (Hanseth and Lyytinen, 2010; Hanseth and Aanestad, 2003; Skorve and Aanestad, 2010; Roden and Chekanov, 2014). The bootstrapping strategy says that one should first develop a simplest possible solution for the first user(s) that deliver benefits to the first user(s) while a network of other users still is lacking. Then new features should be added as the user base, and its heterogeneity is growing.

We will analyse the dynamics and evolution of the Easypaisa platform focusing on the strategy of the platform owner, Telenor Pakistan, strategy for developing and providing new services in order to brining on board new user groups, expanding the number of users within existing groups, stimulate extended use by existing groups etc. We will in particular focus on how the platform is extended with new functions to offer new services is combined with strategies for managing the multi-sided market represented by the various user groups, the evolution of users' absorptive capacity – also how Easypaisa actively contribute to the growth of users' absorptive capacity and in that way enable them to adopt more advanced services.

4. Methodology

We address our research question through a qualitative case study: The establishment, evolution and use of the Easypaisa MFS in Pakistan (Yin R. , 2014). Our data were collected through interviews with different Easypaisa ecosystem stakeholders, various documents and secondary data, more precisely branchless banking statistics from State Bank of Pakistan. For more details on the data sources applied, see table 1 below.

Interviews	Secondary Data
• Telephone and face-to-face interviews in Pakistan (2015-2016) • Semi structured questionnaires, recorded and transcribed	State bank of Pakistan website on Mobile wallet (mWallet)/Over-The-Counter (OTC) statistics 2015-2020) • https://www.pta.gov.pk/en • http://www.sbp.org.pk/
• Eight persons from different Non-Governmental organisations - NGO's (Department managers, Senior research	• NGO websites

managers and Analysists)	• http://www.intermedia.org/ • https://karandaaz.com.pk/ • http://www.helix-institute.com/ • http://www.acted.org/en/pakistan • http://bisp.gov.pk/#
• Eight persons from Easypaisa, Telenor Pakistan and Telenor Group (Financial service specialists, Regulatory and Operational managers and Senior Advisors)	Company web sites • https://www.easypaisa.com.pk/ • https://www.telenorbank.pk • https://www.telenor.com.pk/ • https://www.telenor.com/

Table 1: *Data sources*

The interviewees were selected based on purposive sampling, which allows the research questions better to be answered (Bryman and Bell, 2011). All interviews were following a semi structures questionnaire, recorded and transcribed in full. Both authors conducted sixteen face-to-face interviews. We interviewed different stakeholders in Pakistan, including mobile operator Telenor and governmental organizations like Pakistan Telecommunication Authority and other government agencies together with other non-governmental organizations (NGO's). The face-to-face interviews took place in Islamabad during November 2016. All interviews lasted from one to two hours and took place at the location of the venue of the interviewees, with two exceptions. These two NGO interviews were executed at a neutral venue downtown Islamabad. A short version of the questionnaire was sent to the interviews through a contact person in Telenor Pakistan. In appendix 1, details about the different stakeholders interviewed are presented.

Time limitations required us to narrow down to the most relevant ecosystem members. For instance, agents and competing mobile operators were not interviewed, ref. framework suggested by Zhang and Liang (2011). However, we visited a handful agent stores during our research study in Pakistan and received feedback during the NGO's interviews about the other mobile money providers, trying to mitigate this issue, and to balance the perspectives of the interviewees with a direct connection to the ecosystem, as we believed them to be less prone to subjectivity and able to provide us with an unbiased perspective. Applying multiple data sources in this way corresponds to the triangulation principle described both by (Yin 2014) and (Bryman and Bell 2011). Complete records were kept through all stages of research strengthening the study's trustworthiness (Bryman and Bell, 2011) and enabling backwards tracing preserving the continuous chain of evidence (Yin 2014).

Secondary data were collected from three sources: NGO's, Telenor, and State Bank of Pakistan web sites. The latter were collected from the branchless banking quarterly newsletters from State Bank of Pakistan website. Here periodic trends (3 months) for mWallet to OTC transaction relative share were presented together with information about the distribution of the different agents facilitating OTC and mWallet opening and transactions, as well as break up of OTC and mWallet transactions with respect to type of payments etc. The

quarterly statistics for OTC/mWallet transactions include transactions from all the seven mobile operators in Pakistan. The trend provides a good indication on the development of the OTC/mWallet performance ratio for Easypaisa and the other operators, although Easypaisa and Mobilink together represents close to 90% of the number of mobile accounts in Pakistan in 2018. For more details on distribution of accounts and transaction from the major mobile operators, see appendix 3.

The case comparison shed light on specific service and market developments in Pakistan. It identifies key factors present in mobile payment service ecosystems. This allows us to consider strategic actions taken from the ecosystem perspective, and suggest them for the emerging Pakistani mobile payment ecosystem. As such the results are applicable for other mobile service ecosystems in Pakistan. The applicability is however expected to decrease in other markets with other characteristics than Pakistan, and for other ecosystems.

The data from the interviews and desktop studies/secondary data has enabled us to reconstruct the timeline for the major Easypaisa events and activities taken by MFS stakeholders and actors in Pakistan. Moreover, it has also provided us with understanding of the objectives and perceived benefits for their involvement and actions. The statistics from State Bank of Pakistan verifies the uptake of the mWallets in parallel with the action taken by the various stakeholders in Pakistan. The Easypaisa timeline is presented in appendix 2.

5. The Easypaisa case (Case Overview)
This section describes background and major events related to the development and adoption of the Easypaisa MFS in Pakistan.

5.1 Pakistan: Background and MFS Regulation
Pakistan is the fifth most populous country in South Asia with roughly 212 million inhabitants. The GDP per capita is USD 1.500 and the life expectancy for a child is 66 years (The World Bank, 2016). It has one of the lowest literacy rates in the world: 60% (70 % for men and 49 % for women). The literacy rate is higher in urban (76 %) than in rural areas (51 %) (Rehman et al. 2015).

In 2008 only 15% of the adult population had a bank account (GSMA, 2013). To bring this rate to a much higher level, Pakistan's government has in collaboration with a number of international organizations, including the World Bank and various UN institutions, developed and launched an ambitious strategy for "financial inclusion" and "banking the unbanked" (The international News, 2018). Financial inclusion, it is argued, will offer lots of opportunities to the currently "unbanked" citizens for managing their daily activities and contribute to faster economic development. The aim has been to make individuals open bank accounts ("electronic wallets") so that money transactions happen electronically. This represents an important business opportunity for Easypaisa, and is assumed to make the Pakistani economy more productive by reducing transaction costs, increases transparency and thus reduce the size of the black economy, and - not the least - stimulate economic growth among the poor by facilitating credit-based investments (combined with investing own savings).

As a part of this strategy, the State Bank of Pakistan issued in March 2008 the Branchless Banking Regulation, calling for a bank-led model, i.e. only commercial banks and microfinance banks with an existing banking license were eligible to apply for a branchless banking license. In 2011 this regulation was updated, introducing four levels of branchless

banking accounts with different so-called Know-Your-Customer (KYC) requirements and different upper limits of transactions for the different types of account. Level 0 and level 1 accounts are for individuals only, while level 2 accounts can be opened by individuals as well as by firms, merchants, trusts, non-profit organizations, etc. Level 3 has specific limits and KYC requirements for merchants (Syed, et al., 2016).

The procedures for opening a mobile account registration were comprehensive; it involved a digital photo and a copy of the customer's original government-issued Computerized National ID Card (CNIC) issued by the National Database and Registration Authority (NADRA). Moreover, it was necessary to use an internet-enabled device (computer or smartphone) on site to transfer the customers data to a financial institution, i.e. a commercial bank, an Islamic bank, or a microfinance bank, and finally the customers data were to be verified by NADRA.

Terrorism in Pakistan has become a major problem - 62,096 were killed in terrorist attacks from 2003 to 2017 and 5,303 murdered on sectarian basis from 1989 to 2017 (Sabri, 2017). In December 2014, *Peshawar*, the capital of the Pakistani *province* of *Khyber Pakhtunkhwa* witnessed the bloodiest and the most savage terrorist attack the country has seen in many years (Manzoor and Riaz, 2014). At least 141 people were killed and 121 wounded when seven Taliban gunmen stormed the Army Public School and Degree College. This event led the Pakistani government to implement several anti-terrorism measures. One of these was that all mobile phone users had to register their SIM cards in a national database triggered by the fact that it was found out that the phones used by the gunmen were issued in the names of people who had no obvious link to any militant groups (BBC, 2015). The registration and re-verification of the SIM cards was a massive operation due to the fact that there were approximately 130 million mobile phone users in Pakistan, but the task was made easier by the CNIC system which had been in place since 2005.

This re-verification of SIM-cards implied that all mobile subscriptions in Pakistan were connected to a very strong ID, a biometric ID solution provided and managed by the advanced public body NADRA. This enabled a dramatic simplification of the procedures for opening a mobile bank account, which again had a huge impact on the diffusion of mobile bank accounts. Based on the allowance from the State Bank Easypaisa launched in March 2015 a solution where mobile phone users could dial a specific phone number and automatically open a bank account for the ID connected to the sending phone number. More precisely Telenor subscribers could simply dial *345*3737# while non-Telenor subscribers could open their account by sending 'EP<space>CNIC number' to 0345-111-3737.

5.2 Telenor
Telenor is the former incumbent telephone operator in Norway with subsidiaries in Denmark, Sweden, Finland, Myanmar, Thailand, Malaysia, and Bangladesh in addition to Pakistan. It has recently sold out their businesses in Hungary, Serbia, Montenegro and India.

In May 2004 Telenor Group was awarded a GSM license to build and operate a mobile network in Pakistan, and roughly one year later (March 2005), a full multimedia platform for commercial mobile services was launched under the name of Telenor Pakistan. Telenor Pakistan had in 2017 41 million subscriptions and total revenues of NOK 8 billion. It is the second largest (of four) mobile operator in Pakistan (Telenor Group, 2019).

Like in more or less all of the Global South, mobile phone use is based on prepaid. Accordingly, offering top-up with more minutes is a crucial service which Telenor provides

through a network of about 30 Sales and Services Centres operated by Telenor, and about 278 franchises (long-standing business partners of Telenor Pakistan) responsible for the sales and distribution of scratch cards and electronic top-up. Franchises have geographical exclusivity and are responsible for recruiting and serving retailers i.e. selling and distributing airtime and SIMs through a network of approximately 300.000 agents distributed across Pakistan and which interact directly with subscribers.

Appendix 2 displays the time line of the development of the Easypaisa mobile money service along with major stakeholders and critical events/decisions and from 2009 until 2020.

5.3 Easypaisa: Dvelopment and evolution
In November 2008 Telenor Pakistan acquired 51% ownership stake in the Pakistani microfinance bank Tameer bank, to offer real-time online banking at branches. A joint Easypaisa management team was established to handle decisions concerning the two companies' responsibilities (McCarty and Bjaerum, 2013). In March 2016 Telenor acquired the remaining 49% shares of Tameer bank and rebranded it as Telenor Microfinance Bank (The Express Tribune, 2017). During the same month, Telenor Group and Ant Financial Services Group (Alibaba) in Pakistan signed a strategic partnership agreement, where Ant Financial invests USD 184.5 m for a 45% stake in Telenor Microfinance Bank (TMB), to further develop TMB's mobile payment and digital financial services.

5.3.1 Launch: Over-The-Counter services
The development team decided to launch Easypaisa first as an over-the-counter service (OTC), and a mobile wallet/mWallet solution soon after. OTC requires that a user goes to a Telenor agent with cash, identifying herself with her CNIC card, giving the agent the cash and the name (or ID) of the recipient who could then go to any agent, identify herself and get the cash from the agent. The customer did not have to register and did not need a mobile account (Khan and Rashid, 2015). This model made it possible to serve all citizens and not only Telenor Pakistan customers. The plan was to start with OTC and, and assuming that as customers came to understand the benefits of mobile money, they would migrate to the electronic wallet.

In October 2009, Easypaisa OTC was launched, first with utility bill payments and then money transfer service a few months later. After just 11 months in business, Easypaisa had processed five million transactions. By the end of 2012, this had risen to 100 million transactions with a throughput of US$ 1.4 billion. As the company anticipated, the OTC model gave Easypaisa a wide reach: 70% of its customers were not Telenor Pakistan subscribers.

When Easypaisa was launched in 2009, 2,500 agents were trained and ready to offer Easypaisa services to customers. By the end of its first year (2009) Easypaisa had 8,000 agents trained; three years after launch (2012) there were 20.000. In 2012, Easypaisa embarked on a major agent training and follow-up program with a third party to retrain the majority of its retailers, and in 2016 their agent network nationwide covered 75.000 agents in more than 800 cities across Pakistan.

Telenor Pakistan's 278 franchises were long-standing partners. They had geographical exclusivity and were responsible for recruiting and serving retailers i.e. selling and distributing airtime and SIMs. For Easypaisa, Franchisees were tasked with recruiting, training, and shuttling cash to mobile money agents. In addition to Franchisees and agents,

Easypaisa were offered through Telenor Pakistan's 30 owned and operated Sales and Services Centres and Tameer Bank's 40 bank branches.

When launching Easypaisa 7 mill. USD was invested in the technology platform, national marketing campaigns, organizational structure and agent training (Asif, 2019). In 2015, there were approximately 220 full-time employees involved in Easypaisa.

5.3.2 mWallet services

It was recognized that the OTC model had a number of limitations both for the customers, the mobile money providers (in this case, Easypaisa) and for Pakistan as a whole in order to realize the benefits specified in the World Bank and the Government's financial inclusion strategy. OTC limits the range of financial services to be offered to customers since it is not based on strict KYC requirements Malik (2015). Furthermore, since there is always cash involved in an OTC transaction, there is a heavy burden on the distribution network to collect cash from high cash-in locations and to ensure cash is available at high cash-out locations.

In 2010, the Easypaisa mWallet solution, offering users mobile accounts with money transfer and bill payment services, was launched. Additional products were rolled out over time, including other bill payments services (government, school), charity donation, airtime top up, savings and insurance, etc. Because of the high upfront cost of registration equipment, the Easypaisa channel team prioritized rolling out OTC transaction points over mWallet registration points. One year after launch, only 1,200 of the 8,000 Easypaisa points of sale offered customers the option to sign up for mWallet. Overall, the uptake was slow. One year after launching the service, less than five percent of money transfers and bill payments were conducted through the mWallet. Using the mWallet gave customers up to a 25% discount on certain products, but that was not a compelling enough incentive.

To make Easypaisa more profitable and attractive to users, a diverse range of new services were developed and offered to a variety of user groups. Some of the services required the users to have a mWallet account, others were provided both as an OTC and as a mWallet service.

Soon after the launch of the OTC service, Easypaisa developed and provided a service for so-called bulk disbursement. This is a primarily service for (large) organizations distributing money to a larger number of recipients. These services were followed by payment services for on-line shops and Point-of-Sale (POS) terminals and payment services; money transfer services replacing cash management between large manufacturers (like Coke, Pepsi, and Nestle), and their distributors and merchants; and integration with international remittances and interbank fund transfer services.

5.3.3 The evolution of Easypaisa and other MFSs

According to State Bank of Pakistan (2015, 2017, 2020), the numbers of mobile accounts increased from 7.5 million in q1 2015 to almost 24 million in q1 2017 and to 48,3 million in q1 2020. During the same period the number of mWallet transactions increased from 7,9 mill in 2015, to 77,1 million in 2017, and to 520 million in q4 2020, see figure 1. Although mobile money accounts increased across most demographics, the increase was largest among urban citizens, males and those above the poverty line (Intermedia, 2015) (Financial inclusion insight, 2016). The number of mobile accounts owned by males were 77% (q1 2020), and the vast majority (96%) of these accounts were localized in three of Pakistan's six provinces: Punjab (incl. ISB), Sindh and Khyber Pakhtunkhwa. The breakup of OTC transactions shows

that fund transfers and utility bill payments were dominant both in terms of volume and value, followed by government to person disbursements (State bank of Pakistan, 2017). The breakup of mWallets shows that the majority of transactions were mobile top ups, followed by cash deposits and withdrawals, and fund transfer. Government to person disbursements also represents a significant value of the transactions.

Figure 2 below illustrates the growth in number of OTC and mWallet transactions from 2013 to 2020 (State Bank of Pakistan 2018b, 2019b, 2020) for all MFSs in Pakistan.
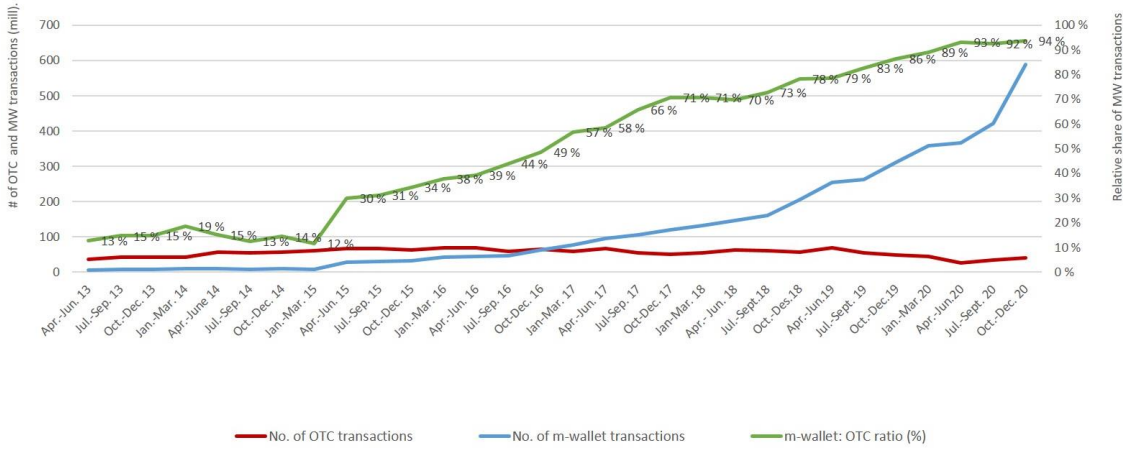
Figure 1: *Number (mill) of mWallets and OCT transactions and relative share (%) from 2013 to 2020 for all providers in Pakistan*

We also see that the OTC solution reached its top in June 2016 with almost 70 million transactions, but has now declined to roughly 40 million transactions in March 2020. The number of mWallet transactions has increased dramatically in the same period from 44 million to 508 million, and covers 94% of all MFS transactions.
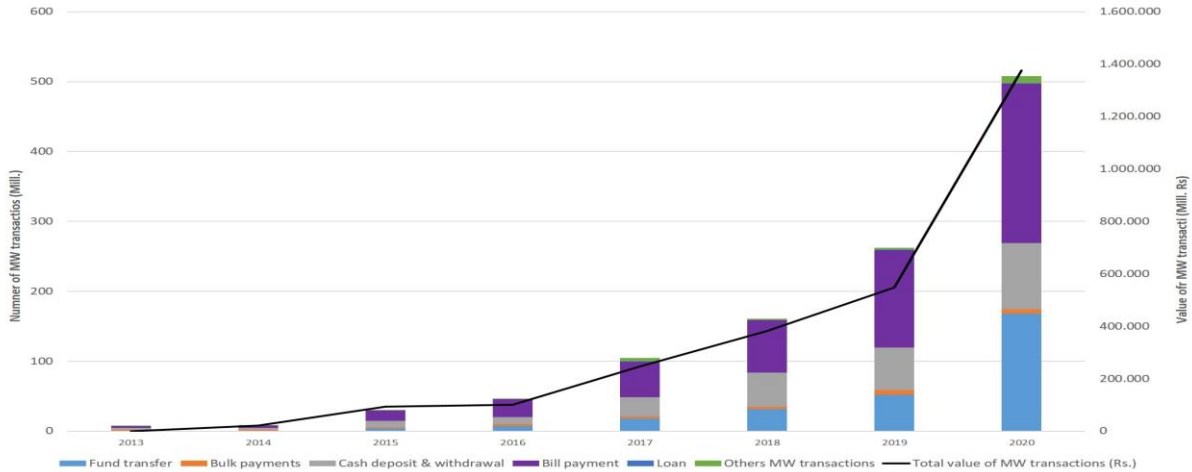
Figure 2. *Distribution of mWallets transactions from 2013-2020*

As Easypaisa was the first MFS launched in Pakistan, in the beginning its market share was 100% in 2010. Of course, this started to decline when other services were launched, apparently stabilizing at app. 35% during 2017. For more detail about the evolution of the market share of the different MFS providers, see appendix 3.

Figure 2 above illustrates the share of different MFS services of the total number of mWallet transactions from 2013-2020.

6. Findings and analysis: variety, dependencies, and timing
We will now look more closely at the evolution of Easypaisa. The issues we find most salient and interesting are related to the following issues:

- The multiplicity of services and multiplicity of connected two-sided markets.
- The variety among members of each group.
- The variety of requirements regarding absorptive capacity of various services.
- How absorptive capacity can be cultivated be introducing services to various user groups and segments within user groups in a specific sequence.
- The long-term evolution of a platform ecosystem.

Over the years, Easypaisa has been providing a broad range of different services to a correspondingly broad range of user groups. Further, there is also huge variety between the user groups as well as within each group – individual citizens, shops, utilities, bulk disbursement organizations, etc. The services provided have been developed and offered to users one by one over more than a decade since Easypaisa was launched. The variety of services and user groups creates a market with a multiplicity of sides – or, alternatively, a variety of interconnected multi-sided markets. In a multi-sided market, managing the dependencies between the sides is a critical issue. In our case, we see that managing the dependencies between the interconnected markets is, may be, an even more critical issue. This means that not only the timing of the enrolment of users, but the timing of the introduction of the various services is crucial. We will analyse these issues by first summarizing the variety of user groups, the heterogeneity of each user group, and the variety of services.

The enrolment of users depends on the number of users on the other side(s), but also on the variety of absorptive capacity among individual users within a group. Further, different services require different absorptive capacities (general literacy, technological literacy, financial literacy, etc.). In addition, the absorptive capacity of individuals develops and grows over time based on their experience form using Easypaisa, but also from friends and colleagues using the service. Making Easypaisa diffuse and its use grow, "banking all the unbanked," also depends on their ability to design and introduce services aligned with users' absorptive capacity and even facilitating or "cultivating" the users' absorptive capacity and financial literacy.

6.1 Number and variety of user groups, and services
During its evolution Easypaisa has come to include a wide range of services:

- Consumer-to-consumer (peer-2-peer) money transfer
- Bill payment (Utilities)
- Point-of-Sale (PoS) payment service for shops and restaurants
- mWallet/account for individual consumers/citizens
- Interbank transfer
- Payment solution for on-line shops
- Savings & credit (cash disposal & withdrawal, loan disbursement/repayment)
- Money transfer between corporations

- Integration with international remittances services
- Insurance
- Bulk disbursement (to individual citizens)
- Credit rating
- Third parties developed services for agriculture and health care

Some of the services supports both OTC and mobile wallet while some requires a mobile wallet. Overall, Easypaisa's services supports and involves a number of different user groups:

- Individual citizens
- Agents (and franchises)
- Government agencies
- Corporations, business organizations
- Utilities
- Shops and restaurants
- On-line shops
- Insurance companies
- Banks
- International remittance services
- Credit rating companies (offering services to the bank, using user data)
- Third parties offering, for instance, agriculture (prices) and health related services

6.2 Markets and network effects

The adoption and use of Easypaisa as a whole establish a multi-sided market. One might say that each user group represents one side in such a market. But it is, may be, more accurate to say that Easypaisa establishes a multiplicity of two-sided markets where each service establishes one such market. Several user groups are using many services – individual citizens are using almost all of them – accordingly, the individual markets are connected and interdependent – but they represent different two-sided markets. To illustrate: Android handset manufacturers, Android app developers, and Android phone users represent a three-sided market since they all sides depend on each other and there are direct network effects between all of them. (More handset manufacturers making Android phones makes Android phones more attractive for both app developers and phone users and so one.) The case of mobile payment services is different. For example, individual consumers may use Easypaisa to pay utility as well as restaurant bills. When doing so, the consumer will use two different services – utility bill and PoS payment services respectively. However, there are no direct network effects between utilities and restaurants – more utilities (restaurants) using Easypaisa will not attract more restaurants (utilities). These two services establish two two-sided markets. On the other hand, there are indirect network effects – or knowledge spillovers – between these services. If a user adopts one of the services and use that, it will be easier (less costly) for this user to also adopt and use the other service.

Further, there are some services offering benefits to individual users independent of other users using the service and which do not create a market or network at all: savings and credit. These services depend on agents though, but the cash disposal and withdrawal and loan disbursement and repayment services offer individuals benefits in terms of a, for some at least, better way of taking care of their money compared to storing them "under the sleep pillow" at

the same time as it gives them increased creditworthiness and opportunities to get loans. In the literature we find cases where individuals put money on their account when traveling to avoid being robbed (Oborn et.al, 2019). The benefits of these services for the individual users are independent of the numbers using it. Loan disbursement and repayment is not a marketplace either, or only marginally so. An individual user interacts normally with only one bank – at least as far as repayment is concerned. The rent will normally depend on the number of banks in a financial market and how hard they compete. On the other hand, the number of individuals that will ask for a loan do not depend on the number of banks as long as online banks have infinite reach.

There is also at least one one-sided market: money transfer between individual citizens. This is a one-sided group because it consists of only one group of as far as the service is concerned. OTC based money transfer can in the same way be seen as a one-sided market with transactions between agents as the agents, actually, are the only direct users of the mobile service in such transactions. Other services, like bulk disbursement (utility bill payment, loan disbursement and repayment, payment in shops and restaurants, etc.) establish two- or multi-sided markets with members of at least two different user groups involved.

Overall, Easypaisa depends heavily on network effects. However, the network effects and the kind of two- or multi-sided markets being present are different for different constellations of user groups and services.

6.3 Heterogeneity within user groups

While Easypaisa involves a variety of user groups, there is also substantial variety among the users within each group. Individual consumers are different regarding literacy (general literacy, financial services literacy, technological literacy, etc.), their resources and income, and the volume and value of financial transactions they are involved in. Their physical location also matters for many services. For instance, in urban areas there are more shops around, accordingly a mobile phone-based payment service will be more attractive. The characteristics of an individual, are important factors in determining whether or when an individual is likely to adopt and start using a specific service. Overall, we see that there is a huge variety of the cost/benefit ratio for different services and for different users.

Benefits depends among other things on the frequency of use and benefits achieved by each transaction. Further, most services involve transactions with other users. The benefits of a specific service for a specific user depend then of the number of users the user is performing financial transactions with are already users of the service (total transaction volume/number of transaction partners connected).

Cost of adopting and using a service depend, among other things, financial costs of adoption (do the user have to buy, for instance, a software package), and other resource demands, for instance integrating a software package with existing systems. Cost also depends on amount of time a user has to spend to learn how to master the service and learn or discover how the service may deliver benefits. The latter factors depend largely on the absorptive capacity of individuals, in case the service is adopted by individual citizens, and organizations, in case the user is an organization. And an important component of absorptive capacity is literacy – general as well as financial.

Users also vary a lot depending on whether they can pay attention to the long-term benefits of a service like Easypaisa, and then invest into adoption even though their short-term benefits will be negligible.

6.4 Launch: enrolling the first users
The long-term vision of Easypaisa, as well as the Pakistani Government, was to "bank the un-banked." This would require a mobile wallet service through which "everybody" carry out "all" their financial transactions. However, Easypaisa concluded early on that making the majority, the poor and un-banked, adopt such services would be challenging – for several reasons. One challenge was to bring the service to the users. To start using such a service, the users had to be informed about the availability of the service, become motivated to use it, register to open an account, install an app, learn to use it, wait for those they would transfer money to or receive from to do the same, etc. Such a solution would be difficult to "ignite" also due to a cumbersome procedure for opening an account due to the very restrictive KYC requirements. Further, it would require an absorptive capacity, in particular literacy - general as well as financial which larger parts of Pakistan's population were lacking.

Based on our theoretical framework, to bring on board the first users Easypaisa should aim at individuals that were easy to get in contact with, developing a low-cost service that required minimum absorptive capacity, i.e. it should be easy to learn how to use it and master its functionality. Easypaisa should also attract organizations that could see potential strategic benefits of the service in the long term and having the financial and absorptive capacity to be an early, or even the first, adopter. Further, Easypaisa should enrol organizations that were also performing transactions as frequently as possible with a largest possible number of partners. Finally, Easypaisa should aim at starting with services that could be provided based by as simple technological solutions as possible, requiring minimum development costs.

Easypaisa's decision to start with the OTC service was perfectly in line with these criteria. They developed a service for utility bill payment having the required functionality for agents to receive an amount of cash form an individual which could then be transferred to the actual utility's bank account. Later this service was modified to support money transfer between individual citizens, followed by the development of a service for bulk disbursement organizations.

Offering individual citizens an OTC service by enrolling agents first worked well because:

- Agents made up a smaller group.
- They were easier to reach through the established (franchise and) agent networks.
- They were in the possession of the required absorptive capacity – they were literate related regarding reading and writing in general as well as when it comes to technology (mobile phones and services, computers, etc.) and financial services.
- They had close contact with most, if not all, mobile phone subscribers and could then also play an active role in marketing and informing mobile phone users about the Easypaisa service and the benefits it offered to the users as well as explaining how to use it.
- And not the least: The OTC services offered the agents a new business opportunity – they had strong economic interests in marketing and offering the service to users.

Further, the OTC service was attractive for individual users for the following reasons:

- Low threshold for users, did not have to learn and master the use of an app, they did not have to make any investments or acquire any kind of technology.
- Easy to understand how to use the service.
- Simple ID procedure.
- Directly available to all citizens, not only Telenor subscribers, actually users did not need to have a mobile phone.

According to Easypaisa, its decision not to establish a separate agent network for mobile money and to instead utilize its existing distribution network for GSM business, as a key reason for its success and the willingness of franchisees to invest with Telenor Pakistan to expand the distribution network was crucial for Easypaisa to build nationwide distribution quickly (GSMA, 2013).

While Easypaisa's main focus was on developing and providing services for individual citizens, they saw it as crucial to enrol business and public sector customers from the very beginning – related to both B2B and B2C services. They first looked for organizations that were transacting with a large number of citizens. Among such organizations they concentrated first on utilities having huge numbers of customers paying their bills at regular intervals, and then on government agencies providing financial support to citizens, first of all Benazir Income Support Programme (BISP). Utilities and, in particular, BISP were, actually, important strategic partners.

In Pakistan there are some Government agencies providing financial support to poor citizens, which, actually, include large parts of the population. BISP is such an agency offering financial support to the largest number of citizens, and a strategic partner of Easypaisa in developing and launching the bulk disbursement service. BISP is the largest social cash program in Pakistan, and covers 15% of the entire population, and 40% of the population below the poverty limit through a variety of programs (BISP, 2016).

In 2008 financial support to the beneficiaries were paid in terms of approximately 1.000 Rupees (PKR) in cash through post offices each month. BISP had concluded that this frequent transfer of cash was not an optimal solution - the costs, fraud and losses were not sustainable. Over the years BISP – and other G2P stakeholders in Pakistan – has experimented with many different digital solutions, and they welcomed in particular digital mWallet solutions (The World Bank, 2012). Although the government agencies that disburse money to beneficiaries keep the banks and MNOs at a professional distance and share the market between actors, they recognize that innovation is dependent on their infrastructure. A BISP representative says: *"Honestly speaking - telcos are not only partners - they are brothers now. Without them - we are sitting on their shoulders. They are carriers. ... there is a huge - hard work from the telcos and the from BISP to reach to this point after four years. If you had been there in Pakistan four years ago - you would see this nightmare which we had. Like four million beneficiaries and money orders [cash]."*

Over the years, Easypaisa has recruited a number of larger bulk disbursement organizations. This includes organizations like the Government's pension organization EOBI (Government of Pakistan, 2002) and public and private employers that can distribute their pensions and salary payments using Easypaisa services as well as a diverse set of NGOs who transfer

money to beneficiaries. One large organization also recruited early was Artistic Fabric & Garment Industries for salary disbursements to through Easypaisa mobile wallets. These organizations reach out to a large part of the Pakistani population at the same time as they had a strong strategic interest in replacing cash transfer with electronic money transfer. By enrolling BISP and utilities virtually all citizens, also the poorest, would benefit from using Easypaisa. They were both easy to recruit by Easypaisa because they saw MFSs as very beneficial for them in the long run and they had the resources required to adopt the service before individual citizens were on board. They trusted users would adopt Easypaisa in due time.

6.5 From OTC to wallets – absorptive capacity and the role of agents
When the OTC service was getting momentum, Easypaisa turned their attention towards mobile wallets. They wanted users to move on from the simple OTC service. That turned out to be challenging – for a number of reasons – illustrating how relations between user groups vary across services.

The OTC service was very attractive for many users – it was useful and very easy to adopt and learn to master. The additional benefits from opening a bank account and start using a mobile wallet service, however, were not so obvious at the same time as the requirements regarding absorptive capacity, including financial literacy, were significantly higher.

Opening a bank account and start using a mobile wallet was, especially before 2015, significantly more complicated than start using OTC services. The latter requires only that a user bring her ID-card and the amount of money to be transferred in cash to an agent and send a message to the receiver. Opening a bank account requires a more complicated user identification process as specified by Pakistan's KYC regulation, and learning how to the wallet solution works.

For a user to open an account she needs first of all to be aware of the existence and availability of the service, second, she will usually also need some help and advice for start using the service. Agents were well positioned, just as in the case of OTC, to play an important role in addressing these challenges because of their presence across the country and their frequent interactions with all mobile users (mostly for minute top-up). The interests of Easypaisa and the agents were perfectly aligned during the introduction of the OTC service. Regarding making the OTC users switch to mobile wallets, however, their interests were in conflict. The agents received a fee paid by Easypaisa for every OTC transaction. This income would be lost when users switch to the wallet solution. This loss of income for agents was money saved for Easypaisa. Further, most agents served several MNOs. At the time Easypaisa started to push for transferring OTC users to mobile wallets, other MNOs had also launched their financial service platforms copying Easypaisa's OTC service. Accordingly, MNOs were competing for agents' support of their services. So, if Easypaisa tried to cut their agents' OTC fees to make it less attractive for them to keep their OTC customers, Easypaisa would run the risk of agents recommending the users to use other MNOs' services rather than Easypaisa's. This situation caused many observers to the conclusion that "agent is king" in the mobile financial services ecosystem in Pakistan (Orakzai, 2016). A Karandaaz representative said: "*For every P2P transaction made via the agent, MNOs pay half of the fee charged to the franchise which is further split equally between the franchise and the agent. In addition to the regular commission paid, the MNOs spend a considerable amount on trade marketing which offers exorbitant proportions of commissions to the agents; in some cases, commissions may amount to over 200% of the value of transaction*". Karandaaz Pakistan is an NGO established

in August 2014, which promotes access to finance for micro, small and medium sized businesses through a commercially directed investment platform, and financial inclusion for individuals by employing technology enabled solution (Karandaaz, 2019).

The success of the OTC service, then, established a kind of dead-lock related to making the users switch to mWallets. One may imagine that this would not have happened if Easypaisa went straight to the wallet solution first. We think, however, that that would not work much better. The threshold for adopting the wallet solution would still be high related to learning, KYC requirements, etc. On the other hand, timing would make a difference. If Easypaisa managed to introduce the wallet service before other MNO's introduced their OTC services or if Telenor's agents did not serve other MNOs, Easypaisa would have more strategic options. They could reduce the fees paid to the agents for each OTC transactions and they could offer them better deals for marketing the wallet solution and help train users in using it.

For all these reasons, the number of mWalled users was close to zero until the reverification of all SIM cards in 2014. It is also worth noting that mWallet and OTC services were interoperable, accordingly an mWallet user could transfer money to or receive from any OTC user (i.e. Pakistani citizen with an ID card). She did not need to wait for other users to adopt the mWallet solution first. From 2015, a mobile phone user could - if she had the required absorptive capacity, (technical skills and financial literacy) open a bank (mWallet) account by simply sending an SMS message to Easypaisa. And we see from figure 1 that the number of mWallet users made a jump during the first quarter of 2015 and started to grow at a steady pace from then on.

6.6 Additional services
Easypaisa transactions, as well as the total volume of mobile financial services transactions, have been growing at a steady pace since Easypaisa was launched in 2009. By the end of 2019, in total 46 million mWallet accounts were opened, of these 24,5 million were categorized as active. Easypaisa's part of these was about 35%. With a total population of 212 million, this means there is still a long way to go before the goal of banking the unbanked is achieved. It also implies that there is a huge potential for future growth for both Easypaisa and the other MFS providers. To make the use of its services grow, Easypaisa has seen it as necessary to work actively in providing new and attractive services to being on board the wealthy as well as the poor and more financial illiterate part of the population, and to maintain its market share.

Easypaisa focused on developing and providing attractive services for four user groups: first and most importantly, mWallet solution for individuals, payment solution for on-line shops, POS payment solutions for physical merchants and restaurants, and B2B solutions for corporations.

6.6.1 mWallet for individuals
To stimulate the adoption of the mWallet solution, Easypaisa offered users 25% discount when buying minutes. This is a regular activity for all mobile phone users, Easypaisa could market it directly to all Telenor subscribers, and should be a service easy to adopt for most mobile phone users and accordingly an appropriate way of introducing the unbanked to bank accounts and mWallet based payment services. In addition, Easypaisa subsidised the mWallet service by putting 100 PKR on each account after the first transaction. And instead of paying users interest rent for the amount of money they saved on their accounts, they gave them minutes, assuming that made more sense and was more attractive for financial illiterates. In

addition, Easypaisa stimulated the use of mWallets by various offerings like giving its users 50% discount on cinema tickets once every month.

Easypaisa also wanted to give more of their users' credit, believing that would enable them to invest in their business whether they were small farmers or running any kind of small business which again would expand their economic activities and accordingly their use of Easypaisa's services. However, to get credit, users need to prove that they were creditworthy. They could do so by saving money on their account. To evaluate their users' creditworthiness, Easypaisa established collaboration with a company having extensive experience in credit rating of mobile payment services in Africa. By 2018 more that 50% of Easypaisa mWallet users had about 1.500 PKR or more on their account. To increase the user value of their service, Easypaisa also integrated their platform with interbank fund transfer and international remittances infrastructures.

Drawing upon the payment solutions for shops (see below), Easypaisa users could withdraw and deposit cash in any Easypaisa shop which numbered 40,000 in around 750 cities by 2018. This service significantly reduced Easypaisa's dependence on their agent. To stimulate the users to open and use an mWallet account further, Easypaisa reduced during 2017 commission on money transactions dramatically at the same time as they increased the commission paid to agent on deposits and opening an account.

6.6.2 Payment solutions

Easypaisa continued to improve their SMS/USSD based payment solution and enrolling more on-line shops using this. In addition, to make Easypaisa more attractive as a payment solution for physical merchants and restaurants, they developed what they called the Easypay Point-of-Sale (POS) solution. This solution combined an app running in the customers' mobile with one running in the shops' mobiles making the latter function as a POS terminal. They first developed and tested out an NFC (Near Field Communication) based solution - with negative outcome. Instead, they developed another solution based on QR (Quick Response) codes.

The QR code-based solution was tested out and improved based on a large number of pilots during 2017. With this solution Easypaisa was first targeting the younger urban and more wealthy population in university districts in the largest cities like Lahore, Karachi, and Islamabad. They did so because using QR codes requires a smart phone and accordingly rather wealthy users, because the density of (coffee) shops and restaurants are high in such districts and wealthy students, because the restaurants and shops have a rather large customer base – in particular students, and, finally, because students are seen as "natural" early adopters of this kind of technology. Further, wealthy students also visit shops and restaurants frequently and generate a high number of transactions. Easypaisa's strategy in this domain was, then, to enrol as many shops, restaurants, and students in the university districts, then enrol other users in the same district in parallel with expanding the service's geographically into neighbouring districts followed by introducing the service to other (university) cities. Late October 2019 25th there were 393 online merchants. From 2018 to 2020 Telenor Microfinance bank made other corporate contracts offering Easypaisa services nationwide for PARCO fuelling stations.

6.6.3 Corporate solution

Easypasia also developed a B2B solution for corporations with a focus on facilitating the removal of cash transfer between large corporations, distributors and merchants. They first targeted large corporations with products sold by large numbers of merchants across the

country like Nestle, Coke, PepsiCo, and Pakistani Tobacco company to digitalize retail to distributor payments and loans/credits. Similar to large bulk disbursement organizations like BISP, these big companies would benefit a lot by removing cash management, they had the resources and (absorptive) capacity to implement the solution in their own organization and to push their distributors and merchants to do the same. And by bringing just these three companies onboard, Easypaisa could also enrol a large number of distributors and merchants. And further, when merchants had adopted Easypaisa's B2B solution, it was easier and more attractive for them to also adopt the Easypay POS solution. Actually, Easypaisa put a lot of effort into developing a good solution for merchants combining these two services.

6.7 Managing variety, dependencies and timing: Cultivating financial literacy – leveraging knowledge spillovers

A key characteristic of Easypaisa and its evolution is the variety and complex relations between the users and services. We will here inquire deeper into this issue drawing upon the Granovetter/Schelling framework. As described in sections 6.1 and 6.2 above, there is a huge variety across as well as within the user groups. In addition, Easypaisa offers in total a broad range of services. The different services relate differently to the various users and user groups at the same time as there are important connections and relations between them. In total, then, Easypaisa establishes a very complex evolving meshwork of users, user groups, and services. We will now look closer of how this structure has evolved, and the "logic" behind this evolution, drawing upon our theoretical framework.

In section 6.3 we pointed out the variety of the cost/benefit ratio for different users and user groups and how this again variety across the range of services offered. However, this ratio is not stable. Most research on platforms have emphasized how network effects generate increased benefits of a service for an individual increases as the number of users is growing. But the cost of adoption is not stable either.

The benefits of using a specific service depends on the volume of transactions of the kind supported by the service a potential user is performing on a regular basis with transacting partners which have already adopted the service. This is different, though when it comes to services which do not involve partners, i.e. credit and savings and cash disposal and withdrawals.

The costs of adopting a specific service depend on the financial and knowledge resources required. Does the user have to buy additional software or other technologies; does, in the case of corporate users, have to integrate Easypaisa software with existing applications and does the user have the financial and knowledge capacity to do this; does the user have the technical skills and financial literacy required to adopt and use the service; does the user have the economic resources to make investments based on long term benefits or if the user only have the resources to make investments that will give immediate benefits, etc. In short, the costs of adoption a service is primarily determined by the service's requirements regarding the absorptive capacity of a user.

This means that the cost/benefit ratio of each service is different for different users at the same time as different services have different cost/benefit ratios for each user. Accordingly, some users are potential early adopter, others late. But this varies across services – one user may be a potential early adopter of one service, but late of another. For a service provider like Easypaisa to enrol a new user at a certain time, it needs to identify users finding existing services beneficial. And as different services have different cost/benefit ratios, which also

depends on the number of other users having adopted the service already, Easypiasa needs to find users finding the service beneficial, or at least worth the required investments, based on the number of users already using the service.

This means that to make Easypaisa successfully diffuse, Easypaisa must first identify and approach and convince the user being willing to adopt a service without any other users being already onboard, then identify, approach, and convince the second users to adopt the service when the first user is already on board, etc. Telenor's agents, large bulk disbursement organizations like BISP and some other public agencies and large utilities have the required absorptive capacity (competence, financial resources to make investments based on long term benefits) and proved to be easy targets. When some of these were on board, receiving money from BISP and other government agencies and paying utility bill were then useful service available for a larger number of citizens/consumers. When a few large bulk disbursement organizations and utilities were on board, it was easier to recruit more members of these groups (for instance pension funds, larger organizations using Easypaisa for paying employees salary, smaller utilities, etc). Consistent with this strategy, Easypaisa approached the largest companies having the largest network of distributors, like Coke, Nestle, and PepsiCo to enrol them as the first users of the corporate solutions supporting money transfer in such distribution networks. When these three were on board, the corporate solution would be beneficial for a large number of distributors.

Different costs of adoption attached to the different services varies. For individual consumers, the different services have different requirements regarding financial literacy. The OTC services, given the assistance agents can offer, have proved to be easy to adopt even for the less financial literate while the mWallet services are more demanding. This illustrates the fact that in line with the Granovetter/Schelling model, services may be ranked according to the absorptive capacity they require from their potential users. Most relevant regarding individual users, in particular, but also for small business for instance in remote and rural areas, is financial and technological literacy.

For individual citizens with low financial literacy, it was clear that the OTC service proved to be easy to adopt even for the less financial literate while the mWallet services are more demanding. The mWallet solution makes a range of services available, each of them having different requirements regarding absorptive capacity. For instance, cash deposit and withdrawal appear to be the easier one to adopt and is also a service the others are based upon. We also consider money transfer to have lower absorptive capacity requirements than saving/credit and payment using a POS service.

This means that individual citizens may adopt services not requiring absorptive capacity beyond their current level. The same goes for, for instance, small business. When shopkeepers adopt and use the service for money transfer to distributors, they become more qualified for adopting the POS service, etc. When distributors have adopted the service for money transfer (between themselves and manufacturers), they have increased their absorptive capacity to adopt, for instance, the bulk distribution service for paying salary to their employees. And the same happens if the services are adopted in the opposite sequence.

However, as said above, the cost of adoption of a service, including absorptive capacity requirements, is not necessarily stable. We all learn from experience. And so also MPS users. Most financially illiterate have the capacity to adopt the OTC service. And by using this and interacting with agents the learn more about MFSs – they learn more about financial services

as well as how mobile phones may support such services. They increase their absorptive capacity and become more capable to adopt services with higher requirements. And in this way also the financially illiterate may be able to "climb the ladder" of increasingly more sophisticated services and become financially literate.

The growth of users' absorptive capacity take place as knowledge spillovers. There are such spillovers when a user's experience from using one service makes it easier for the user to adopt another. However, knowledge spillovers also happens as users learn from friends and family members. This implies, then, that there are also network effects and self-reinforcing processes between services – not only users. The more services, or the larger network of services, a user has adopted, the easier it will be to adopt yet another one.

The unbanked and financially illiterate represents a significant part of the Pakistani population and as such a potentially large customer group for Easypaisa. And to bring this group on board, Easypaisa needs a strategy for introducing the variety of services in a way accounting for the level of literacy of the potential users at a certain point in time and at the same time utilizing knowledge spillovers and network effects between services to contribute to the increase in the users' financial literacy so that users can adopt increasingly more sophisticated services. And, actually, we think that the way Easypaisa has evolved and promoted its services can be formulated as such a strategy – a strategy for leveraging knowledge spillovers and *cultivating financial literacy*.

The Pakistani government and NGOs also see increasing the poorer populations' financial literacy as a "critical success factor" for achieving financial inclusion. The Pakistani government is offering courses and training programs to the financial illiterate (Karandaaz, 2019) (State Bank of Pakistan, 2019) (Pakistan Government, 2015) (State Bank of Pakistan, 2018). NGOs are researching the use of MFSs in Pakistan as well as many other developing countries and, among other things, giving seminars and courses for MFS providers about how they can improve their services and strategies to become more successful in "banking the unbanked."

The cost of adoption can be reduced by making the user interface of the services as smooth, intuitive and simple as possible. And just as in the case of financial literacy, through experience users will also increase their technological literacy and capacity to adopt technically more complex services. Accordingly, MFS providers should also cultivate the users' technological literacy.

7. Concluding discussion

Easypaisa has been evolving and growing – in terms of number of services as well as users – since its launch in 2009. Among the users we find many previously "unbanked" citizens and organizations. Easypaisa has contributed to financial inclusion of the unbanked in Pakistan, but there is still a long way to go before this goal is reached. That also implies that there is still a large potential for future growth for Easypaisa in terms of users as well as number of transactions performed.

Network effects (and multi-sided markets) have played an important role in the evolution and growth of Easypaisa and its user base. But its evolution cannot be described as a slow growth in the early days before it "ignites" when critical mass is reached and the adoption "explodes" (Evans and Pirchio, 2015; Evans and Schmalensee, 2016). Evans and Pirchio (2015) find in their survey of 22 MFS platforms in developing countries that such platforms either "ignite"

or they fail to diffuse with Easypaisa as an exception. They call Easypaisa's diffusion "slow ignition." Evans and Pirchio (2015) point to regulation as the most critical factor explaining whether an MFS platform "ignites" or not. And MFSs in Pakistan are very well regulated through their Branchless Banking legislation from 2008. And we see that regulation played a role in the adoption of Easypaisa. The strict KYC requirements made the adoption of the mWallet solution very slow before the reverification of all SIM cards in 2014 and that the diffusion was boosted when this reverification made it possible for Easypaisa to let a user open an account by just sending an SMS.

Banking and financial services are well regulated in all modern societies to guarantee their integrity. While lax regulation may make it easier for users to adopt and use MFSs and for providers of such platforms to make profit, we see no reason why MFSs should be treated different from financial services provided through other technologies. Accordingly, it is crucial for actors that intend to provide MFS to figure out how to succeed in a well-regulated market. And the diffusion of Easypaisa demonstrates, in our view, how that may be achieved. It certainly requires the service providers to work out a more sophisticated strategy comparted to what is required in an unregulated context. However, strict regulation guaranteeing the integrity of MFS can be combined with other measures which makes the adoption of the services smooth. In our case, this happened through the reverification of the SIM cards which was based on the NADRA's data base containing information about the identities of Pakistani citizens and its availability for the MFS providers to verify users' id.

The idea the diffusion of MFSs ignites and explodes when critical mass is reached is based on the assumption that all users are basically equal and that only their numbers determine the value an MPS offers to its users. This is definitely a too simple model for understanding and managing the dynamics of a platform like Easypaisa. The varieties among as well as within user groups is huge in a country like Pakistan at the same time as Easypaisa offers a wide range of services that may deliver hugely different benefits to the different users and having similar differently absorptive capacity requirements. Financial inclusion, then, requires MFS providers to implement a strategy taking into account and addresses issues related not only to network effects and multi-sided markets but also the variety among users and user groups and how the different services create different, but connected and interdependent, multi-sided markets. And most important and challenging, they need to introduce services and enrol users in a way that contributes to the increase in their absorptive capacity, in particular financial literacy, of the poor and more or less illiterate members of the Pakistani population – they need a strategy for cultivating financial literacy.

Research on platforms and platform ecosystems focuses on the platform owner and its users. But achieving financial inclusion by means of MFS platforms also requires social innovation in the sense of making the platforms user establish new practices (Babu, et al., 2020). Babu et al (2020) found that social innovations related to MFS required strategic collaboration between a range of different partners including mobile phone operators and banks. The Easypaisa case supports this. Easypaisa was first of all established in close partnership between Telenor and the Tameer microfinance bank. But Easypaisa evolved through the establishment of and based on strategic partnership with key customers that had a strong interest and would get huge long-term benefits from MFSs. Most important in this respect was BISP, but also utilities and large organizations like Nestle belong to this category. Further, Telenor (as well as other mobile phone operators) cooperated closely with Pakistan's Telecommunication Authority and NADRA in establishing a solution for easy reverification of SIM cards which Telenor and Easypaisa saw as a strategic initiative to reduce the threshold

for opening a bank account and adopting the mWallet solution. In addition, Easypaisa was integrated with interbank transfer and international remittances services.

8. References

Alaimo, C., Kallinikos, J. and Valderrama, E. (2020). Platforms as service ecosystems: Lessons from social media. Journal of Information Technology, 35(1), 25-48.

Arthur, W. B. (1994). Increasing returns and Path Dependence in the Economy. Ann Arbor: The University of Michigan Press.

Asadullah, A., Faik, I. and Kankanhalli, A. (2018). Evolution Mechanisms for Digital Platforms: A Review and Analysis across Platform Types. Proceedings of 39th International Conference on Information Systems, (pp. 1-9). San Francisco.

Asif, S. Z. (2019). 5G Mobile Communications - Concepts and technologies. https://books.google.no/books?id=yg1mDwAAQBAJ&pg=PT363&lpg=PT363&dq=easypais a+fundamo+platform&source=bl&ots=Lmmw-7-a4V&sig=GODBnpQG2_SALaNU3fpck_jbCAo&hl=no&sa=X&ved=2ahUKEwjM_oeF9O7 cAhWBQJoKHXW8ClMQ6AEwBXoECAUQAQ#v=onepage&q=easypaisa%20fundamo%2 0platfo

Babu, M. M., Dey, B. L., Rahman, M., Roy, S. K., Alwi, S. F. and Kamal, M. M. (2020). Value co-creation through social innovation: A study of sustainable strategic alliance in telecommunication and financial services sectors in Bangladesh. Industrial Marketing Management, 89, 13-27.

BBC. (2015). Pakistan takes aim at Sim cards in anti-terror drive. bbc.com: http://www.bbc.com/news/world-asia-31924186

BISP. (2016). Benzir Income Support Programme. bisp.gov.pk: http://www.bisp.gov.pk/

Bonina, C., Koskinen, K., Eaton, B. and Gawer, A. (2021). Digital platforms for development: Foundations and research agenda. Information Systems Journal (IF 4.188). doi:10.1111/isj.12326

Bryman, A., & Bell, B. (2011). Business Research Methods, 3rd Ed. Oxford: Oxford Univeristy Press.

CGAP. (2015). Digital Financial Inclusion: Implications for Customers, Regulators, Supervisors, and Standard Setting Bodies. www.cgap.org : http://www.cgap.org/sites/default/files/Brief-Digital-Financial-Inclusion-Feb-2015.pdf

Cohen, W. M. and Levinthal, D. (1989). Innovation and learning: The two faces of R&D. The Economic Journal, 99 (September), 569-596.

Cohen, W. and Levinthal, D. (1990). Absorptive capacity: A new perspective on learning and innovation. Administrative Science Quarterly, 35(1), 128-152.

Dailytimes. (2015). Mobicash caters to over 500,000 active accounts. dailynews.com: http://dailytimes.com.pk/business/11-Dec-15/mobicash-caters-to-over-500000-active-accounts

de Reuver, M., Vershuur, E., Nikayin, F., Cerpa, N. and Bouwman, H. (2015). Collective action for mobile payment platforms: A case study on collaboration issue between banks and telecom operators. Electronic commerce research and applications, 14, 331-344.

Evans, D. S. and Pirchio, A. (2015). An Empirical Examination of Why Mobile Money Schemes Ignite in Some Developing Countries but flounder in Mist. Coase-Sandor Working Paper Series in Law and Economics No. 723, 2015.

Evans, D. S. and Schmalensee, R. (2016). Matchmakers: The new economics of multisided platforms. Harvard Business School Press.

Financial inclusion insight. (2016). Pakistan - Wave report FII tracker survey March 2016. Washington: Financial inclusion insight. http://finclusion.org/uploads/file/reports/InterMedia%20FII%20Wave%203%20Pakistan%200 602.pdf

Foster, C. and Heeks, R. (2013). Innovation and scaling of ICT for the bottom-of-the-pyramid. Journal of Information Technology, 28, 296–315.

Gilson, R. (1999). The legal infrastructure of high technological districts, Solicon Vallet, Route 128 and covenants not to compete. New York University Law Review, 74(3), 575-629.

Government of Pakistan. (2002). Employees Old Age Benefits Institution. http://www.eobi.gov.pk/

Granovetter, M. (1983). Threshold models of diffusion and collective behaviour. Journal of Mathematical-Sociology, 9(3), 165-179.

GSMA. (2013). MMU Case Study: Easypaisa Mobile Money Innovation in Pakistan. https://www.gsma.com/mobilefordevelopment/programme/mobile-money/mmu-case-study-easypaisa-mobile-money-innovation-in-pakistan

GSMA. (2015). State of the Industry Report on Mobile Money. http://www.gsma.com/mobilefordevelopment/programme/mobile-money/state-of-the-industry-2015/

GSMA. (2016). Mobile Insurance, Savings & Credit Report. http://www.gsma.com/mobilefordevelopment/programme/mobile-money/2015-mobile-insurance-savings-credit-report

Hanseth, O. and Aanestad, M. (2003). Bootstrapping networks, communities and infrastructures. On the evolution of ICT solutions in healthcare. Methods of Information in Medicine, 4(42), 385-391.

Hanseth, O. and Lyytinen, K. (2010). Design theory for dynamic complexity in information infrastructures: the case of building the internet. Journal of Information Technology, 25, 1-19.

Intermedia. (2015). Financial Inclusion Insights: PAKISTAN Quicksights report FII Tracker Survey. http://finclusion.org/uploads/file/reports/2015%20InterMedia%20FII%20PAKISTAN%20QuickSights%20Summary%20Report.pdf

Kahn, K. (2016). Telenor: Financial inclusion is a good sustainability initiative and business opportunity. http://blogs.worldbank.org/psd/telenor-financial-inclusion-good-sustainability-initiative-and-business-opportunity

Karandaaz. (2019). The Unbanked: A hundred-million question. https://karandaaz.com.pk/blog/unbanked-hundred-million-question/

Khadija, A., Khalid, U. and Khalid, Z. (2012). Promoting Financial Inclusion and Literacy in Pakistan via G2P Payment Programs. microfinanceconnect.info: http://www.microfinanceconnect.info/assets/articles/Promoting%20Financial%20Inclusion%20and%20Literacy%20in%20Pakistan_October%202012_PMN.pdf

Khan, I. and Rashid, N. (2015). Using Mobile Money to Promote Financial Inclusion in Pakistan. www.karandaaz.com.pk: http://karandaaz.com.pk/Using-Mobile-Money-to-Promote-Financial-Inclusion-in-Pakistan

Kingiri, A. N. and Fu, X. (2020). Understanding the diffusion and adoption of digital finance innovation in emerging economies: M-Pesa money mobile transfer service in Kenya. Innovation and Development, 10(1), 67-87.

Latour, B. (1987). Science in Action. How to Follow Scientists and Engineers Through Society. Harvard University Press: Cambridge, Massachusetts.

Latour, B. (1996). Aramis, or The Love of Technology. Cambridge, Massachusetts: Harvard University Press.

Latour, B. (1999). Pandora's Hope. Essays on the Reality of Science Studies. Cambridge, Massachusets: Harvard University Press.

Malik, Y. (2015). Risks to financial inclusion. http://www.dawn.com/news/1202434/risks-to-financial-inclusion

Manzoor, A. and Riaz, A. (2014). The darkest hours. https://tribune.com.pk/story/808019/our-darkest-hour/

McCarty, M. and Bjaerum, R. (2013). Easypaisa: Mobile Money Innovation in Pakistan. http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/07/Telenor-Pakistan.pdf

Oborn, E., Barrett, M., Orlikowski, W. and Kim, A. (2019). Trajectory dynamics in innovation : developing and transforming a mobile money service across time and place. Organization Science, 30(5), 1097-1123.

OECD. (2013). Advanced National Strategies for Financial Education - A joint publication by Russia's G20 PResidency and the OECD. Retrieved 6 20, 2016, from oecd.org: https://www.oecd.org/finance/financial-education/G20_OECD_NSFinancialEducation.pdf

Ondrus, J., Gannamaneni, A. and Lyytinen, K. (2015). The Impact of Openness on the Market Potential of Multi-Sided Platforms: A Case Study of Mobile Payment Platform. Journal of Information Technology, 30(3), 260-275.

Orakzai, M. (2016). Mobile Money: The OTC and Agent Dilemma. http://karandaaz.com.pk/blog/mobile-money-otc-and-agent-dilemma

Ozcan, P. and Santos, F. (2015). The market that never was: Turf wars and failed alliances in mobile payments. Strategic Management Journal, 36(10), 1486-1512.

Pakistan Government. (2015). National Financial Inclusion Strategy - Governments 100 days agenda. http://finance.gov.pk/NFIS.pdf

Pakistan Telecommunications Authority. (2020). Annual reports 2016-2018. pta.gov.pk: https://www.pta.gov.pk/en/data-&-research/publications/annual-reports

Parker, G., Van Alstyne, M. and Choudary, S. (2016). Platform revolution. How Networked Markets Are Transforming the Economy and How to Make Them Work for You. Norton & Company.

Potnis, D., Gaur, A. and Singh, J. (2020). Analysing slow growth of mobile money market in India using a market separation perspective. Information Technology for Development, 26(2), 369-393.

Rehman, A., Jingdong, L. and Hussain, I. (2015). The province-wise literacy rate in Pakistan and its impacts on the economy. Humanities and Social Sciences, 1, 140-144. doi: http://dx.doi.org/10.1016/j.psrb.2016.09.001

Rochet J.-C. Tirole, J. (2006). Two-sided markets: a progress report. The RAND journal of Economics, 37(3), 645-667.

Rochet, J.-C. and Tirole, J. (2003). Platform competition in twosides markets. Journal of the European Economic Association, 990-1029.

Roden, J. and Chekanov, A. (2014). Architectural Constraints on the Bootstrapping of a Personal Health Record Systems. Scandinavian Journal of Information Systems, 2(26), 53-78.

Rogers, E. (1962). Diffusion of innovations. New York: New York: Free Press of Glencoe (1st ed.).

Rukanova, B., de Reuver, G., Henningsson, S., Nikayin, F. and Tan, Y. (2017). Overcoming blockages to collective innovation in digital infrastructures: The case of Mobil Payment. Proceedings of 25th European Conference on Information Systems, (pp. 1486-1512). https://aisel.aisnet.org/ecis2017_rp/71/

Sabri, F. (2017). 67399 people killed in terro attacts during past 15 years. pakistantoday: https://www.pakistantoday.com.pk/2017/05/20/67399-people-killed-in-terror-attacks-during-past-15-years/

Schelling, T. (1978). Micromotives and macro behaviour. Ney York: W.W Norton.

Senyo, P. M. and Karanaasios, S. (2020). How do fintech firms address financial inclusion? ICIS 2020 Proceedings. Association for Information Systems. https://aisel.aisnet.org/icis2020/societal_impact/societal_impact/7/

Shapiro, C. and Varian, H. R. (1999). Information rules: A Strategic guideline to the Informtion Economy. Boston: Harvard Business School Press.

Skorve, E. and Aanestad, M. (2010). Bootstrapping Revisited: Opening the Black Box of Organizational Implementation. Scandinavian Conference on Information Systems, 111-126.

State Bank of Pakistan. (2015). National Financial Inclusion Strategy Pakistan. afi-global.org: http://www.afi-global.org/sites/default/files/publications/national-financial-inclusion-strategy-pakistan.pdf

State bank of Pakistan. (2017). Quarterly Branchless Banking newsletter - Issue 23. sbp.org.pk: http://www.sbp.org.pk/publications/acd/2017/BranchlessBanking-Jan-Mar-2017.pdf

State Bank of Pakistan. (2018). National Financial Literacy Program Newsletter, Vol 1, Issue 3. https://www.sbp.org.pk/sbp_bsc/BSC/DFSD/NFLP/2018/NFLP-Sep-Dec-2018.pdf

State Bank of Pakistan. (2018b). Quarterly Branchless Banking newsletter - Issue 30. sbp.org.pk: http://www.sbp.org.pk/publications/acd/2018/BranchlessBanking-Oct-Dec-2018.pdf

State Bank of Pakistan. (2019). Financial Literacy & Capacity Building: https://www.sbp.org.pk/Finc/FL.asp

State Bank of Pakistan. (2019b). Quarterly Branchless Banking Newsletter. http://www.sbp.org.pk/acd/branchless/Stats/BBSQtr-Oct-Dec-2019.pdf

State Bank of Pakistan. (2020). Quarterly Branchless Banking Newsletter.
https://www.sbp.org.pk/acd/branchless/Stats/BBSQtr-Oct-Dec-2020.pdf

Staykova, K. and Damsgaard, J. (2020). A 2020 Perspective on "The Race to Dominate the Mobile Payments Platform: Entry and Expansion Strategies". Electronic Commerce Research and Applications, 41(May-June).

Stykova, K. and Damsgaard, J. (2016). Adoption of Mobile Payment Platforms: Managing Reach and Range. Journal of Theoretical and Applied Electronic Commerce Research, 11(3), 65-84.

Syed, I., Shaukat, Z., Azmatullah., Rajesh, R., Nasreen, S. and M., R. M. (2016). Branchless Banking Regulations - For Financial Institutions desirous to undertake Branchless Banking.
http://www.sbp.org.pk/bprd/2016/C9-Annx-A.pdf

Telenor Group. (2019). Telenor Pakistan. Retrieved November 15, 2019, from
https://www.telenor.com/about-us/global-presence/pakistan/

The Express Tribune. (2017). Tameer microfinance bank is now Telenor mocrofinance bank.
https://tribune.com.pk/story/1368966/tameer-microfinance-bank-now-telenor-microfinance-bank/

The International News. (2018). PM approves National Financial Inclusion Strategy.
https://www.thenews.com.pk/latest/396900-pm-approves-a-5-year-plan-for-enchanced-nfis

The World Bank. (2012). Pakistan: Evolution of the payment Mechanisms in the Benazir income support program (BISP). web.Worldbank.org: http://go.worldbank.org/IVIK6MA0D0

The World Bank. (2014). Measuring financial inclusion around the world. http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB

The World Bank. (2016). World Bank Open Data.
https://data.worldbank.org/country/pakistan?view=chart

Van Alstyne, M. W., Parker, G. and Sangeet, P. (2016). 6 Reasons Platforms Fail.
https://hbr.org/2016/03/6-reasons-platforms-fail

Wall Street Journal. (2018). How Mobile Money Drives Economic Growth. (W. S. Journal, Editor) Retrieved February 2, 2021, from http://www.wsj.com/ad/article/mlf-how-mobile-money-drives-economic-growth

Wenner, G., Bram, J., Marino, M., Obeysekare, E. and Mehta, K. (2018). Organizational models of mobile payment systems in low-resource environments. Information Technology for Development, 24(4), 681-705. doi:10.1080/02681102.2017.1311830

Wittek, S. (2016). Innovation and standardization in the case of Easypaisa in Pakistan. Innovation and Standardization in the case of Easypaisa in Pakistan. Master Theisi, University of Oslo.
https://www.duo.uio.no/bitstream/handle/10852/51139/1/ferdig-master.pdf

Yin, R. (2014). Case study research: Design and methods. Beverly Hills: Sage publications.

Zahra, S. A. and George, G. (2002). Absorptive Capacity: A Review, Reconceptualization, and Extension. Academy of Management Review, 27(2), 185-203.

Zhang, J. and Liang, X. J. (2011). Business ecosystem strategies of mobile network operators in the 3G era: the case of China mobile'. Telecomminications Policy, 35(2), 156-171.

Appendix 1: Stakeholders interviewed

Data sources	Comments
Interviews • Director General Enforcement Division • 5 colleagues from Enforcement Division	Pakistan Telcommunication Authority https://www.pta.gov.pk/en
• Senior Analyst	Intermedia (NGO) http://www.intermedia.org/
• Senior Analyst • Senior Associate	Karandaaz (NGO) https://karandaaz.com.pk/
• Senior Research Manager	Helix Institute of Digital Finance (NGO) http://www.helix-institute.com/
• Deputy Country Director	Acted (NGO) http://www.acted.org/en/pakistan
• Payments Complaints specialist • Head of Payment, Complaints unit	Benazir Income Support Programme (NGO) http://bisp.gov.pk/#
• Assistant Manager, Business Environment • Credit Analyst Specialist • Financial Services Sales Specialist • Management Planning representative, Product development Department • Man. Operations representative, Product development department	Easypaisa (Mobile Money Provider) https://www.easypaisa.com.pk/
• Director Regulatory and Interconnect • Assistant Manager Channels Operations	Telenor Pakistan (Telecom provider Pakistan) https://www.telenor.com.pk/
• Senior Advisor, Financial Services unit	Telenor Group (Telecom provider world-wide) https://www.telenor.com/

Appendix 2: Major events and activities

2009-2014

GENERAL
2009
Telenor Pakistan aquire 51% of Tameer Microfinance Bank (TMB)

SERVICES & ACTIVITIES
2009
OCT transactions , Utility bill payment, money transfer
2010
Mobile Wallet, Air-time top-up, Savings & Insurance
2013-2014
ATM cards, Inter Bank Fund Transfer (IBFT)
2014
M-Wallets registration with biometric verfication
Handset financing

REGULATORS
2014
Telco regulator implement strict biometric ID requirement for all new mobile ssubscriptions
2014
Bank regulator accept mobile subscriptions for level 0 bank accounts, i.e. enables easy account opening

COMPETITORS
2010-2012
UBL Omni, Timepey
2013-2014
Upaisa, HBL-Express, Mobile Paisa, MobiCash

AGENTS
2009
8000 Easypaisa agents
2012
20.000 Easypaisa agents

G2P, B2C AND NGO PARTNERS
2012
BISP (Benasir Income Support Programme)
2014
SERP (Sindh Education Sector Reform Programme)
2010-2014
Helix, ACTED, Karandaaz, Intermedia

2015-2017

GENERAL
20016
Renamed to Telenor Microfinance Bank when aquiring remining 49% of Tameer Microfinance Bank

SERVICES & ACTIVITIES
2014-1015
Marketing campaigns, Biometric string verification
Easypay launched
2016
Mobile account credit and loans
Biometric money transfer service
Easypaisa Adroid App, Car Insurance &Digital Lending
Fundamo relaunch payment platform (Ericsson)
2017
Donateonline launched, first online donation portal

REGULATORS
2015
Telco regulator implement strict biometric ID re-verification for all mobile subscriptions, enables easy opening of level 0 bank accounts

COMPETITORS
2015
MobiCash and UBL Omni launch biometric string registration
2015-2017
JazzCash, PayMax, Meezan Upaisa, JS Bank

AGENTS
2016-2017
75.000 Easypaisa agents across 800 cities
117.000 nationwide Easypaisa agents
2015-2017
267.000 agents for all mobile operators (2015)
368.000 agents for all mobile operators (2017)

G2P, B2C AND NGO PARTNERS
2014-2015
Rabat bakers, Coffee planet, Cenepax movie centers
2016
NESTLE partnership
Bank Alfalah partnership to boost financial inclusion

2018-2020

GENERAL
2018
Alipay (subsidiary of Ant Financial Services aquires 49% of Telenor Microfinance Bank (TMB)

SERVICES & ACTIVITIES
2017
Awarded «Best Microfinance Bank and «Bank the Unbanked» in Pakistan in 2016 and 2017

G2P, B2C AND NGO PARTNERS
2018-2019
- TMB and PepsiCo launch Easypaisa based merchant to distribution payment solution
- TMB and Samsung Electronics to digitalize payments to its retailers using Easypaisa solution
- TMB and Takaful Pakistan Limited enables shariah based insurance for customers through Easypaisa
- TMB and Pakistan Tobacco Company Limited to digitalize retailed to distributor payments and credit/loans through Easypaisa
- TMB and PMN Pakistan Microfinance Network to digitalize microfinance industry through Digital services platform
- Easypaisa and Careem collaborate to offer 'Top Up' service for Mobile Wallet users
- TMB and Artistic Fabric & Garment Indstries to for salary disbursement through Easypaisa Mobile wallet services
- TMB and Pakistan Bait-ul-Mal to promote financial knowledge in women of the country
- TMB and Artistic Fabric & Garment Indstries launch salary disbursement solution through Easypaisa Mobile wallet services
- TMB & TOTAL PARCO to offer Easypaisa Services Nationwide for PARCO fueling stations
- Easypaisa Loan, Pakistan's first digital nano loan using Easypaisa mWallet launched by TMB
- TMB launch Easypaisa QR payment systems solution at univeristites and colleges
- TMB partners with Thardeep Microfinance Foundation for digital disbursals and repayment of credits to the beneficiaries in Sindh rural areas
- TMB partners with Valyou of Malaysia lauching Pakistan's first blockchain-based cross-border remittance service from Alipay

Appendix 3: Distribution of cellular and MFS market shares in Pakistan (Pakistan Telecommunications Authority, 2020)

In 2018 the total number of subscribers were 150 mill, and Telenor has roughly 44 mill mobile subscribers. The largest competitor in the Pakistani mobile subscriber market is Mobilink launched in 2014. Mobilink was aquired 100% from Vodaphone in 2015/2016 and in 2016 Mobilink acquired 100% of the competitor Warid. The new company was rebranded to Jazz in 2017. Moreover, the mobile operator CMPak was aquired by Chine Mobile in 2007 and rebranded to Zong in 2008 (Pakistan Telecommunications Authority, 2020). According to Dailytimes (2015) Mobilink/ Mobicash's effective strategies towards registering and education of customers on mobile account as well as introduction of the "string" model and launch of ATM card had contributed to market growth. See more details in appendix 3 and 4.
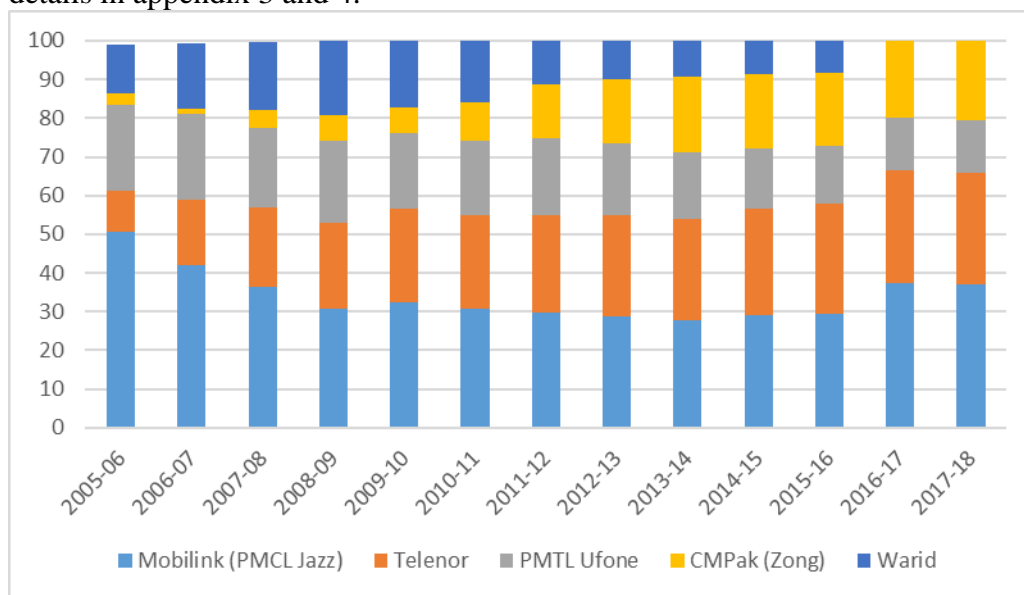
Mobile money market shares for Easypaisa and their major mWallet competitor, Mobilink State Bank of Pakistan

Market share %. (Oct-Dec. all year)		Tameer/Telenor (Easypaisa)	Mobilink/Jazz(Mobicash)
2014	Agents	32%	19%
	Mobile accounts	64%	20%
	Active accounts	25%	48%
	Volume (#) of transactions	55%	14%
	Value of transactions	49%	14%
2015	Agents	32%	19%
	Mobile accounts	64%	20%
	Active accounts	26%	28%
	Volume (#) of transactions	54%	26%
	Value of transactions	52%	23%
2016	Agents	30%	19%

	Mobile accounts	46%	40%
	Active accounts	39%	43%
	Volume (#) of transactions	43%	39%
	Value of transactions	50%	30%
2017	*Agents*	29%	18%
	Mobile accounts	51%	40%
	Active accounts	56%	36%
	Volume (#) of transactions	33%	53%
	Value of transactions	39%	41%
2018	*Agents*	31%	19%
	Mobile Accounts	41%	45%
	Active accounts	34%	52%
	Volume (#) of transactions	35%	52%
	Value of transactions	36%	41%

Distribution of other mWallet transactions from 2014 to 2020 (Source: State Bank of Pakistan)

Other mWallet transactions	2014 July-Sept.	2016 July-Sept	2018 July-Sept.	2019 July-Sept.	2020 Jan-.Mar
Donations	20,21%	1,6%	1,82%	1,3%	9,1%
Retail Payments	78,6 %	10,6%	28,3%	67%	69,6%
International Home Remittance	0	0	0,1%	0,1%	0%
Account opening transactions	0	0	2,2%	2,2%	2,8%
Cash collection payment service	0	1,8%	6,8%	1,6%	2,2%
IBFT (Inter Bank Fund Transfer)	1,1 %	85,8%	65,4%	28%	16,2%
Number of transactions (1000)	29.422	473.927	1.804.179	3.055.465	5.803.485