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The (non-)emergence of mobile money systems in Sub-Saharan Africa: A comparative multilevel perspective of Kenya and Nigeria

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ABSTRACT

Mobile money systems are radically transforming the lives of a large fraction of the Sub-Saharan population. The emblematic success story of M-Pesa of Kenyan telecommunications operator Safaricom has received wide acclaim for being both the first company that launched mobile money and its mass adoption in just a few years. Despite efforts to replicate this success in other countries in Sub-Saharan Africa, many are struggling to get mobile money off the ground. This paper aims to contribute to a better understanding of the mechanisms that explain these differences by using a comparative case study analysis of Kenya and Nigeria that are comparable in many respects but are extreme opposites in their adoption of mobile money. Theoretically drawing on a combination of a multilevel perspective of sociotechnical transformation (MLP) and innovation ecosystems, we identify the idiosyncratic elements that play a role in the development of a critical mass of user and agent networks necessary for the survival of mobile money systems. We argue that while network externalities have contributed to a mass adoption of mobile money in Kenya, the different institutional and industrial conditions in Nigeria suggest that network externalities are taking much more time to be generated there and that achieving similar adoption rates as in Kenya might therefore just be a matter of time.

1. Introduction

In just 10 years, mobile money - "money that can be accessed and used via mobile phone" (Jenkins, 2008: 5) – has radically transformed the lives of a significant portion of the Sub-Saharan African population. Almost non-existent in 2007, Sub-Saharan Africa (SSA) counted 277 million registered mobile money accounts by the end of 2016, of which more than 100 million were active users (GSMA, 2017). Combining the financial services of financial institutions with the telecommunications functions of mobile networks to store and transact money in a digital form, it has contributed significantly to financial inclusion of the SSA population. As a result, people are "*safer, are more productive with their time and their money, and are able to take advantage of increased socio-economic opportunities*" (GSMA, 2017: 6).

While the explosive growth of mobile money systems is not limited to SSA only, the undisputed most widely used example of its success is the Kenyan M-PESA mobile money system. Kenya's M-PESA was the first mobile money operator (MMO) to achieve mass adoption, and it is said to serve about 80% of Kenya's adult population as of 2016 (Intermedia, 2016a). However, even though the success of M-Pesa could provide other countries with a model of how to achieve similar diffusion rates of financial inclusion through mobile money, the same success story has not been realized in every country hoping to adopt this technology. While Nigeria and Kenya share similar levels of economic development, mobile phone adoption, bank branch penetration and needs for financial inclusion, as of 2016 only 1% of the Nigerian adult population was an active user of mobile money, and only 12% was aware of its existence (Intermedia, 2016b), despite significant efforts of the Nigerian government to kickstart mobile money in Nigeria. Why is it that a desired technological innovation is massively adopted in one country, while it fails to spread in another? This paper seeks to understand the origins of differences in mobile money uptake by comparing the conditions that have facilitated or hampered the development of the mobile money systems in Kenya and Nigeria.

In order to understand this differential emergence of mobile money systems in Kenya and Nigeria, we draw on a multilevel perspective of sociotechnical transitions (Geels, 2002; Geels and Schot, 2007) and in particular its most recent extensions that integrate an ecosystem perspective to how innovations diffuse (Adner, 2017; Walrave et al., in press). Using a combination of archival material and interviews in a comparative case analysis research design, we trace the historical development between 2000 and 2016 of mobile money in both countries and explore the mechanisms that were at the source of their difference. We conclude that, because mobile money systems depend on network

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externalities generated by mobile money users, the ecosystem depends on a very fragmented base of actors that are difficult to engage in the ecosystem. While many actors blame the government for the almost non-emergence of mobile money in Nigeria, we show that this is only part of the explanation. Whereas the Kenyan conditions (institutional and organizational) were quite unique in allowing for a fast emergence of a mobile money ecosystem, the different socio-economic starting conditions in Nigeria triggered an institutional setup that does not prevent a mobile money ecosystem from emerging, but it will inevitably take more time to develop the interactions between the various actors, activities, positions and links necessary for the ecosystem to emerge.

After grounding our research questions in extant theoretical conversations and an explanation of the research methodology used, we present a rich description of the development trajectories for each country consecutively that lead us to these conclusions. By comparing both cases, we then discuss the implications of our findings for innovation ecosystems transitions and SSA.

2. Theoretical background

Students of innovation have addressed the question of the emergence and diffusion of new technologies and innovation from a wide range of scientific fields. Economic geographers and historians have described the diffusion of innovation as following an aggregate pattern that follows an S-curve over time, during which the supply of innovations requires significant resources and time at the beginning to be adopted primarily by a small group of early adopters. Depending on the type of technology and the reactions of these early adopters, the diffusion patterns may gain momentum, crossing the chasm between early adopters and the (early) majority (Moore, 2002) and subsequently shift to higher levels of adoption with less resources and time required for suppliers (Rogers, 2003; Tushman and Anderson, 1986). Evolutionary economists describe innovations as creatively disrupting (Schumpeter, 1934) technological regimes that defined what economic actors considered to be technically feasible (Nelson and Winter, 1982), and with transitions between regimes being described as struggles against inertial forces that favor the status quo (Gilbert, 2005; Hannan and Freeman, 1984; Nelson and Winter, 1982). In the past decade this originally mostly technology-focused evolutionary perspective has been broadened with elements of institutional theory (DiMaggio and Powell, 1983; Fuenfschilling and Truffer, 2014; Meyer and Rowan, 1977) and science and technology studies (Bijker, 1997; Callon et al., 1986) to integrate the notion that the diffusion of technologies and innovations can only be understood by examining the socio-technical context in which they are embedded as well (Geels, 2002; Granovetter, 1985). For example, according to the Multilevel Perspective (MLP) of technological transitions (Geels, 2002), the diffusion and emergence of innovations and technologies has to be seen as socio-technical transitions between socio-technical regimes (Geels and Schot, 2007). These socio-technical regimes are defined as "the 'deep structure' that accounts for the stability of an existing socio-technical system" and that "refers to the semi-coherent set of rules that orient and coordinate the activities of the social groups that reproduce the various elements of socio-technical systems" (Geels, 2011: 5). Sociotechnical regimes generate stability through the "material aspects of the system, embedded actors and organizational networks, and the rules and regimes which guide perceptions and actions" (Genus and Coles, 2008: 1438). Sociotechnical transition pathways are then the result of a dynamic interplay between activities and actors that are interacting in different levels of structuration between each of these constituting elements (Geels, 2002; Geels and Schot, 2007). Socio-technical regimes operate at meso-level and offer a dynamic resolution of tensions between the various components of the regime. The ongoing tensions at regime level are also the product of the macro-level socio-economic context in which the regime is embedded – the "landscape" level in MLP terms, and the unstructured experimentation that happens at micro-level – the "niche level" in MLP terms. While the performance of the innovation may initially be low when in the niche phase, niches provide the critically important locus for learning processes about a wide variety of dimensions that influence the diffusion of an innovation, as well as a "space to build the social networks which support innovations, e.g., supply chains, user–producer relationships" (Geels, 2005: 684).

Although MLP has been criticized for a lack of specificity on the boundaries and definitions of a regime, as well as the role of agency in socio-technical transitions (Geels, 2011; Geels and Schot, 2007; Genus and Coles, 2008), its sensitivity to socio-technical conditions for the explanation of innovation patterns offers a particularly suitable theoretical lens through which to study mobile money in Kenya and Nigeria. Indeed, as the technology behind mobile money is rather simple, i.e. basic mobile phone technologies that were widespread in both countries, the answer to the differential adoption patterns needs to be rather searched in the sociotechnical domain. Furthermore, the MLP offers a holistic and cross-theoretical heuristic on innovation processes and trajectories that is indifferent to the origins and mechanisms that drive it. At the heart of the theory is a model of diffusion of innovations that begins with actors starting novel activities in a niche that is protected from the inertial or defensive forces from the sociotechnical regime, after which the innovation spreads when evolutions or jolts occurring at landscape or regime level open up windows of opportunities for the niche activities to become more structurally embedded at regime level (Geels, 2002, 2011; Geels and Schot, 2007). For MLP, these niches can only survive from the meso-level inertial pressures that avoid disruptions of the status quo in the sociotechnical regime if they are somehow protected against them. Such "immunity" against institutional pressures (Greenwood & Suddaby, 2006; Lepoutre and Valente, 2012) can be both exogenous (e.g. regulatory exemptions, subsidies) or endogenous (novel business models, new ecosystems, slack resources) (Walrave et al., in press).

Yet because MLP is agnostic about the origins and mechanisms that structure niches into more stable socio-technical regimes, a wide range of transition mechanisms are possible that depend on the specificities of the actors, their relationships, their roles and their activities and how they these are embedded in the broader context. Perhaps as a result, the initial socio-technical transition pathways were often presented as linear, causal processes (Genus and Coles, 2008), whereas it is known that the complex interactions between many interdependent variables produce nonlinear and emergent behaviors that are often hard to replicate (Maguire et al., 2011). In order to add this additional complexity to the analysis of transition pathways, recent MLP studies have integrated the theoretical apparatus of "ecosystems" into MLP (Walrave et al., in press), aiming to add more detail and structure with regards to the anchor points and levers that impact socio-technical transitions.

2.1. Innovation ecosystems

An ecosystem, defined as "*the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize*" (Adner, 2017: 42) is an inter-organizational structure that is needed to realize an overarching common goal, the "ecosystem value proposition" (EVP) (Walrave et al., in press). This ecosystem value proposition, which is ultimately defined from the perspective of the end user (Clarysse et al., 2014) is what determines the boundaries and necessary constituting elements of the ecosystem, or what is called the "ecosystem model" (Walrave et al., in press). Any ecosystem model (EM), then, consists of four types of components (Adner, 2017): (1) the *activities* that have to be undertaken to realize the EVP, (2) the *actors* that undertake these activities, (3) the *positions* or roles that actors take up in the interaction of activities by actors, and (4) the *links* or transfers of value, rewards, information or other between actors. Ecosystems differentiate themselves from loosely coupled networks because of their *interdependence* between each of these components. Any actor for whom there is a reason to no longer contribute to the EVP may impact the