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## Inclusive Innovation and Rapid Sociotechnical Transitions: The Case of Mobile Money in Kenya

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# Inclusive innovation and rapid sociotechnical transitions: The case of mobile money in Kenya<sup>1</sup>

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## Abstract

Mobile money innovation is at the centre of a sociotechnical transformation in the financial services sector in Kenya that manifested in changes in the regulatory framework, in market shares, user practices and social networks across multiple regimes. While sociotechnical transitions often take about 50 years, the mobile money revolution in Kenya has taken only 15 years, and has resulted in remarkable levels of financial inclusion of marginalised people. In this paper we combine the multi-level perspective (MLP) from the sustainability transitions literature and the Ladder of Inclusivity (LII) from the inclusive innovation literature to explain this rapid transformation. Applying both frameworks to the case enables us to elucidate potential areas for cross-fertilisation between MLP and LII, thus responding to calls for the inclusion of a social dimension in the transitions perspective, while explaining how processes of change envisioned (but weakly defined) in LII can be explored. Based on our findings, we hypothesise that a rapid socio-technical system transition takes 1) strong landscape pressures, an opening up of regime which makes regime actors willing to act, and strong niche development all oriented towards the same goal, and 2) regime actors motivated by the normative goal to take risks and respond favourably to the mix of developments at all three levels.

## Keywords

Sustainability transitions, multilevel perspective, inclusive innovation, ladder of inclusivity, mobile money, financial services

## 1 Introduction

Policymakers and international organisations in the developing world now consider mobile money innovation as a promising avenue for tackling financial exclusion among low-income and vulnerable segments of the population (ADB, 2013; GSMA, 2015; IMF, 2016; World Bank, 2013b). Various multinational financial inclusion-oriented networks such as the *Better that*

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*Cash Alliance*, the *Alliance for Financial Inclusion* and the *G20 Financial Inclusion Peer Learning Program* are exploring how lessons learned from successful deployments of mobile money can be shared among member states. One such exemplar of success is M-Pesa, a mobile money platform developed, piloted and deployed in Kenya in 2007, now operational in seven African countries, and in India, Romania and Albania. M-Pesa was launched in 2007, and was rapidly adopted in the first year of operation, reaching 5.1 million active users by December. Between 2007 and 2013, M-Pesa subscription grew to 17.1 million users supported by an agent network of 65,547 outlets (Safaricom, 2013). In this duration, other competing mobile operators deployed similar platforms which cumulatively increased mobile money subscription to 26.2 million users—about 74.5 percent of the adult population (CBK, KNBS, & FSD Kenya, 2016). The government of Kenya now credits mobile money with extending access to formal financial services to previously marginalised communities (Ndung'u, 2014).

This paper explores how we can explain the rapid transformation of financial services in Kenya. We do this by analysing the introduction of M-Pesa from a multi-level perspective (MLP) (Rip and Kemp, 1998; Geels, 2002; Grin et al., 2010) which is designed to explain socio-technical system transitions. The introduction of M-Pesa can be characterized as such because its rapid growth meant not only the development of a new technology, but also a transformation of the commercial banking business model, and in fact the financial services industry. This is evidenced by changes in the regulatory framework, user practices and social networks across the domains of both formal and informal finance, and in market shares of incumbent financial service providers. Besides cash, mobile money became the most popular person-to-person transaction medium such that it accounted for 66.56 percent of the throughput volume in Kenya's national payment system.

While the fast and deep transformation of the financial services sociotechnical system was surprising and needs explanation, however, perhaps even more remarkable is the inclusion of hitherto completely excluded poor people in the system. Whereas the MLP has proven to be relevant for analysing sociotechnical system change, it has not yet been applied to cases where issues of social inclusion are key. Even in MLP studies of transitions in developing countries, these cases have focused on transitions to environmental sustainability, mostly low carbon transitions in Asia (Iizuka, 2015; Rock, Murphy, Rasiah, van Seters, & Managi, 2009) and Africa (Baker, Newell, & Phillips, 2014; Byrne, 2011; Romijn & Caniëls, 2011; van Eijck & Romijn, 2008). A few calls have been made for including a social dimension into the transition perspective (Meadowcroft, 2000; Swilling & Annecke, 2012) but this remains a largely unexplored area. To fill this gap we argue that insights from the inclusive innovation literature may be a fruitful addition to the sustainability transitions literature and in particular the MLP. We use the Ladder of Inclusive Innovation (LII), a framework to assess levels of inclusivity (Heeks et al., 2013). At this point we do not argue for a merger between both frameworks, but rather, we see them as complementary. Therefore in this paper we conduct a separate analysis of the M-Pesa case from each perspective and then identify areas where both strengthen each other.

In our analysis we use multiple sources of evidence. We collected documentary evidence from several sources: annual reports, press releases, legislation, regulatory guidelines and formal remarks from the two concerned regulatory authorities, i.e. Central Bank of Kenya (CBK) and the Communication Commission of Kenya (CCK)<sup>3</sup>. We also collected annual reports from the innovating firms, Vodafone Group and Safaricom Ltd, and from the four largest commercial banks in Kenya. Further evidence was collected from the print media and television video clippings of reports on M-Pesa, the banking sector and informal groups, from advertisements, blogs and social media. In addition, we use the nationally representative FinAccess Household Surveys of 2006, 2009 and 2013 (n=4214, n=6598, n=6449 respectively)

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<sup>3</sup> Now Communications Authority of Kenya (CAK)

conducted by the Central Bank of Kenya, Kenya National Bureau of Statistics (KNBS) and Financial Sector Deepening (FSD) Kenya to track access to and demand for financial services among adults. We also use the 2015 FinAccess Geospatial Mapping Survey to plot and describe the geographical reach of banking and mobile money services. Our documentary evidence and quantitative datasets are substantiated by semi-structured interviews with representatives from Vodafone Ltd, Safaricom Ltd and the Central Bank of Kenya (n=7). In addition, transcripts from four focus groups with informal financial groups (*chamas*) in Nairobi and Western Kenya were used. We also observed M-Pesa functionality and real-time transactions at agent outlets in Nairobi. Finally, published research papers and policy briefs on mobile money provided useful insights. Drawing evidence from multiple independent sources enabled us to check the consistency of our findings in a process of triangulation (Yin, 2009).

For both the MLP and the LII, we provide detailed analytic explanations of the case. The analytical procedure entailed first writing a detailed narrative or chronicle of developments in the financial services sector and innovation of M-Pesa. The descriptive historical account was then converted into analytic accounts presented in theoretically relevant language (George & Bennett, 2005). This was achieved by moving back and forth between both theoretical frameworks and the data, modifying explanations in light of the theoretical emphasis placed by each approach on various aspects of the narrative, effectively focusing on “what are thought to be particularly important parts of an adequate or parsimonious explanation” (George & Bennett, 2005, p. 215) in each case.

The paper proceeds as follows: in sections 2 and 3 we introduce the MLP and the inclusive innovation approach respectively. In section 4 and 5 we apply the frameworks separately to the empirical case, and in section 6 suggest how they can be cross-fertilised so that they can better account for social exclusion and inclusion. We conclude by considering the implications of our proposals for future empirical work.

## **2 The multi-level perspective (MLP)**

One of the central approaches that describes and analyses sociotechnical change processes is the multi-level perspective (MLP) (Geels, 2002; Geels & Schot, 2007; Rip & Kemp, 1998; Smith, Stirling, & Berkhout, 2005). In this model, socio-technical transitions unfold through developments on three interdependent analytical levels that exist in a nested hierarchy: the socio-technical regime at the meso-level, the niche at the micro-level, and the landscape at the macro-level. The notion of levels refers thus to analytical levels, not to levels in a geographical sense. The regime represents the highly institutionalized, yet not necessarily fully coherent set of rules that mutually construct and are constructed by actors. The rules are embedded in skills, regulations, expectations, user preferences, products and infrastructures etc; elements which together form a system of provision for mobility, energy, food etc. The technical and social elements in the regime co-evolve, align and stabilise with each other over time, creating rigidities that only enable or allow the development of innovations in specific directions. These innovations can be incremental or revolutionary in terms of exploiting the opportunities which exist within the regime, however that stay within the boundaries specified by the rule-set.

Radical or disruptive innovations go beyond the rule-set and therefore arise out of technological niches, or protected spaces (Kemp, Rip, & Schot, 2001; Smith & Raven, 2012) analytically located at the micro-level. The niche shields nascent innovations from the structural pressures of the sociotechnical regime (Geels & Raven, 2006; Kemp, Schot, & Hoogma, 1998). Micro in this context refers to a low degree of institutionalisation which is evident in the low stability of the rules, uncertainty about development trajectories, and a relative small social network behind it (compared to the regime). The sociotechnical regime and niches exist within a broader exogenous environment at the macro-level referred to as the

sociotechnical landscape (Geels, 2004; Rip & Kemp, 1998). The landscape consists of grand developments and structures in technology and infrastructure, politics, cultural values and worldviews, demographical developments, ecological developments and other discourses occurring at the global scale. These developments—which cannot be directly changed at will by actors—exert pressure on the sociotechnical system, influencing the trajectory of both the regimes and the niches. For a MLP analysis it is crucial to determine the time period and place of the analysis, e.g. the unit of analysis. For example one could analyse the regime in a city for one decade or in a country for five decades. What counts as relevant landscape (exogenous environment) might differ for each case. In our case we focus on financial services regime and the rise of the mobile money niche from 2000 up until 2015, with some consideration of what happened before.

The core contribution of the MLP is that the dynamic interplay of elements within and between the levels results in the occurrence of a sociotechnical transitions. Internal dynamics within the regime may generate misalignments among the elements, creating tensions and instability. In addition, developments at the landscape and/or the niche level may put pressure on the regime, creating or exacerbating tensions and instability. These tensions create windows of opportunity for the breakthrough of innovations arising out of the technological niche.

Since its conception, the scope and robustness of the framework has evolved as its limitations continue to be addressed, for instance, facilitating a better understanding of the delineation of the levels and regimes and operationalizing regime transformation using insights from neo-institutional thinking (Fuenfschilling & Truffer, 2014; Raven & Verbong, 2007) and formal evolutionary modelling (Safarzyńska, Frenken, & van den Bergh, 2012), a more explicit consideration of agency, power and politics in the framework by incorporating more perspectives from institutional theory (Fuenfschilling & Truffer, 2016) and political economy (Baker et al., 2014), and incorporating spatial (global and local) dimensions by drawing insights from economic geography (Coenen, Benneworth, & Truffer, 2012; Hansen & Coenen, 2015). MLP-based studies also have begun to analyse the agency of civil society actors and users shaping transition processes (Schot, Kanger, & Verbong, 2016; Seyfang & Smith, 2007). However, issues of social inclusion and exclusion have not been systematically addressed. Although the MLP offers a useful framework for understanding socio-technical change, we suggest that it needs conceptual renewal to account for sustainability transitions to social inclusion. Insights from the inclusive innovation literature discussed in the next section may provide a fruitful starting point.

### **3 Inclusive Innovation**

The notion of inclusive innovation has drawn the attention of scholars, governments and development partners alike in recent years (Cozzens & Sutz, 2014; Heeks, Foster, & Nugroho, 2014; IDRC, 2011; Kaplinsky, 2011a; Paunov, 2013; UNCTAD, 2014; World Bank, 2013a). Although this area of research is nascent according to the World Bank (2013a), it sheds light on the idea that innovation can be used to tackle social exclusion. In doing so, the inclusive innovation literature mobilises ideas on social exclusion, poverty, inequality, and innovation systems.

For discussing social exclusion, it is important to identify who the excluded are. In the inclusive innovation literature the marginalised or excluded have often been associated with economic/income poverty, with referential terms such as *the poor* being used pervasively (Chataway, Smith, & Wield, 2005; Cozzens & Kaplinsky, 2009; G. George, McGahan, & Prabhu, 2012; Heeks, Amalia, Kintu, & Shah, 2013). Poverty is measured in Purchasing Power Parity terms as used in Millennium Development Goals targets which classify individuals living below \$1.25 per day as absolutely poor, and those living above \$1.25 but below \$2.50 per day as

poor. The term Base of the Pyramid (BoP) has also been adopted in reference to these populations (Kaplinsky, 2011b). However, as Sen (2000) asserts, poverty and by extension, exclusion, are multidimensional constructs, citing Silver's (1994, p. 541) list of things that the excluded are unable to access: "a livelihood; secure, permanent employment; earnings; property, credit, or land; housing; minimal or prevailing consumption levels; education, skills, and cultural capital; the welfare state; citizenship and legal equality; democratic participation; public goods; the nation or the dominant race; family and sociability; humanity, respect, fulfilment and understanding". Social exclusion therefore has economic, social, political, individual, spatial and group dimensions.

New forms of innovation are emerging in developing countries to cater to the welfare of communities experiencing these exclusions. Such innovative activities are referred to as 'innovation for inclusive development', or 'inclusive innovation' (Chataway, Hanlin, & Kaplinsky, 2014; Cozzens & Sutz, 2014; Heeks et al., 2013; Paunov, 2013). Table 1 provides a typology of other terminologies used in relation to innovation *for* marginalised groups which we characterise as 'top-down', or innovation by marginalised groups characterised as 'bottom-up'. Because Heeks et al. (2013) capture the broad variety of these various types in a Ladder of Inclusive Innovation (LII) we decided to use this approach for our analysis. The LII (depicted in Figure 1) conceptualises the following steps through which greater levels of inclusivity are achieved through innovation:

- **Level 1/Intention:** an innovation is inclusive if the intention of that innovation is to address the needs or wants or problems of the excluded group.
- **Level 2/Consumption:** an innovation is inclusive if it is adopted and used by the excluded group.
- **Level 3/Impact:** an innovation is inclusive if it has a positive impact on the livelihoods of the excluded group.
- **Level 4/Process:** an innovation is inclusive if the excluded group is involved in the development of the innovation. This step can be broken down further to gauge inclusion of the excluded groups in each of stages of the innovation process, i.e. invention, design, development, production, distribution. Heeks et al. (2013) complicate this step further by considering the level of participation of excluded groups in the innovation process ranging from excluded groups just being informed about the innovative process, to the excluded controlling the innovative process.
- **Level 5/Structure:** an innovation is inclusive if it is created within a structure that is itself inclusive, i.e. the underlying institutions that make up the innovation system are inclusive.
- **Level 6/Post-Structure:** an innovation is inclusive if it is created within a frame of knowledge and discourse that is itself inclusive.

Each level represents a gradual deepening and broadening of the extent of inclusion achieved through innovation processes.

Table 1. Types of inclusive innovation. Source: Authors' compilation

	<b>Producers/actors in the innovation process/ site of innovation</b>	<b>Origin</b>	<b>Target and driving force</b>	<b>Related terms</b>	<b>Remarks</b>	<b>Examples</b>
<b>Grassroots innovation</b>	<ul style="list-style-type: none"> <li>▪ Innovators/entrepreneurs in the informal sector (Gupta, 2013)Public institutions</li> <li>▪ Community based organisations and co-operatives (Seyfang &amp; Smith, 2007)</li> <li>▪ Non-profit organisations, activists</li> </ul>	Bottom-up	Social need, ideology	Social innovation (Seyfang & Smith, 2007)	<ul style="list-style-type: none"> <li>▪ Associated with environmental sustainability (Seyfang &amp; Smith, 2007), 'ecological ethics' (Gupta et al., 2003)</li> <li>▪ Innovating groups are small, low-profile, voluntary, citizen-led (Chanan, 2004)</li> <li>▪ Draw from traditional knowledge (Gupta et al., 2003)</li> </ul>	<ul style="list-style-type: none"> <li>▪ The Honey Bee Network (India)</li> </ul>
<b>Social innovation</b>	<ul style="list-style-type: none"> <li>▪ Communities, local governments, universities, firms</li> <li>▪ Public-private partnerships</li> </ul>	Top-down & Bottom-up	Social need, ideology	Social technologies (Fressoli, Smith, & Thomas, 2011; Hanlin & Muraguri, 2009); Social entrepreneurship, social ventures	<ul style="list-style-type: none"> <li>▪ Innovation geared towards problem-solving and sustainable business models rather than profitability</li> <li>▪ 'social' used as the opposite to 'economic' (Cozzens &amp; Sutz, 2014)</li> </ul>	<ul style="list-style-type: none"> <li>▪ The microfinance model (Grameen Bank, Bangladesh)</li> <li>▪ Arogya Ghar Clinics for Mass Care (India)</li> </ul>
<b>Pro-poor innovation</b>	<ul style="list-style-type: none"> <li>▪ Firms: large firms, multinationals/transnationals</li> <li>▪ University research (Alzugaray, Mederos, &amp; Sutz, 2012)</li> <li>▪ Public-private partnerships (Chataway, Hanlin, Mugwagwa, &amp; Muraguri, 2010)</li> </ul>	Top-down & Bottom-up too	Profit	'Below the radar' innovation (Kaplinsky, 2011b); Bottom of the pyramid, BRI (Cozzens & Sutz, 2014)	Refer to innovations for and by the poor in general. There is no clarity in the literature about how this term is used.	
<b>Frugal innovation</b>	<ul style="list-style-type: none"> <li>▪ Western multinationals (Agarwal &amp; Brem, 2012)</li> <li>▪ MNCs in emerging economies e.g. China, India (Zeschky, Widenmayer, &amp; Gassmann, 2011)</li> </ul>	Top-down	Profit (low-cost manufacturing)	Frugal engineering, Reverse innovation, Constraint-based innovation, Cost innovation, Jugaad (Rao, 2013; Zeschky et al., 2011); Disruptive innovation (Christensen, 1997)	<ul style="list-style-type: none"> <li>▪ Western corporations have been overtaken by corporations in emerging markets that understand the resource-constrained customer better (Agarwal &amp; Brem, 2012)</li> <li>▪ Frugal innovation products originally designed for developing markets have entered markets in industrialised countries (Zeschky et al., 2011)</li> </ul>	India's Tata Nano car; Chinese Mini Magical Child washing machine by Haier
<b>Informal sector innovation</b>	<ul style="list-style-type: none"> <li>▪ Entrepreneurs in the informal sector (Micro SMEs) (Cozzens &amp; Sutz, 2014; Kraemer-Mbula &amp; Watu, 2010)</li> </ul>	Bottom-up	Profit		<ul style="list-style-type: none"> <li>▪ Typically use recycled materials</li> <li>▪ Characterised by clusters</li> <li>▪ A knowledge mix between indigenous knowledge and foreign knowledge from formal sector (Cozzens &amp; Sutz, 2014)</li> </ul>	<i>Jua Kali</i> enterprises in Kenya (McCormick, 1987), Suame Magazine in Ghana (Mytelka & Farinelli, 2000)

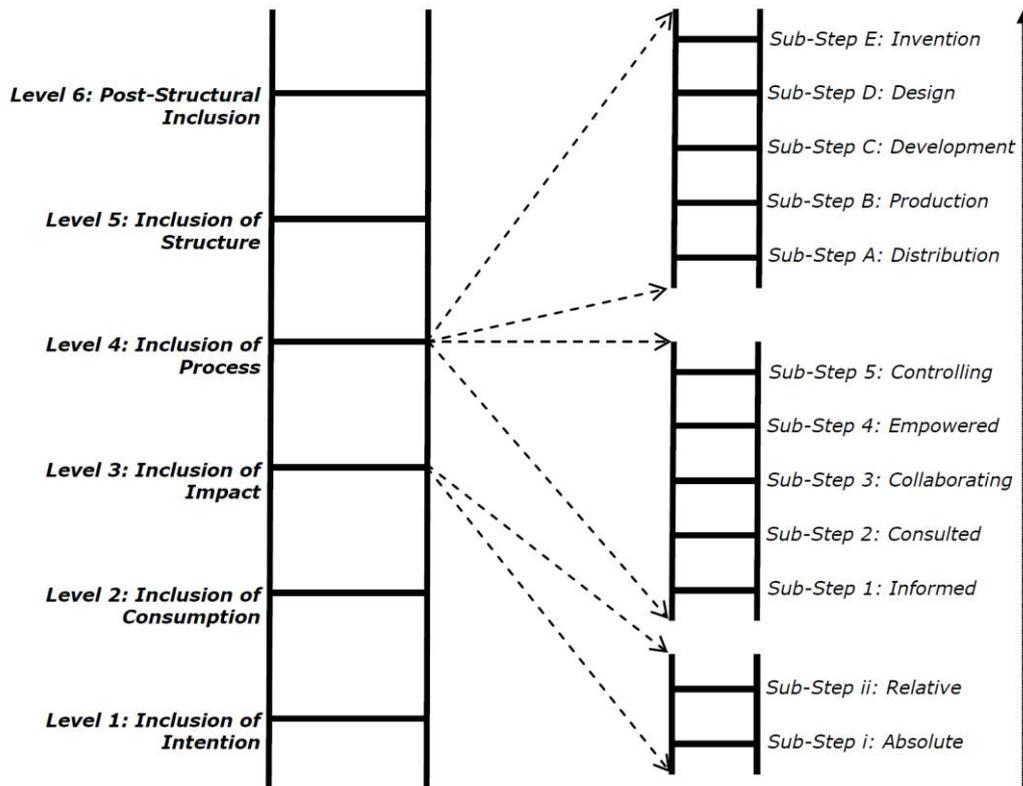


Figure 1. The ladder of inclusive innovation (LII) depicting different levels (or gradations) of inclusion. Source: Heeks et al. (2013).

In the next two sections we will analyse our case-study from both a MLP and a LII perspective.

### 3. Case analysis from the multilevel perspective

#### *Pre-Developments; the establishment of a formal money regime in Kenya*

One of the most significant landscape factors that influenced the development of the Kenyan financial services industry throughout the 20<sup>th</sup> century was the establishment of the colonial state in the 1890s. The British colonial government introduced formal financial services in the form of commercial banking by foreign multinational banks, a currency system based on foreign currencies<sup>4</sup> as the medium of exchange, and a legal code governing the sector including regulation through a state-owned Central Bank (Ochieng' & Maxon, 1992). Until then, native African communities relied on an already well-established barter trade system, and only moved on to cowrie shells, precious beads and cloth later in the 19<sup>th</sup> century. Since the establishment of the British protectorate until the attainment of independence in 1964, formal financial services were dominated by British banks concentrated in major towns, focused on financing trade, and exclusively served the settler immigrant community. Apart from the Post Office Savings Bank which accepted African savings since 1910, these banks had virtually no involvement with the native African population. These developments birthed a formal financial services regime.

<sup>4</sup> First the Indian currency the rupee was adopted, and it was replaced with pound sterling as the sovereign legal tender on 1 April 1906 by order of the colonial state

The formal regime started to diversify with the entry of new market actors in the 1960s: banks from South Africa, India and Turkey which expanded the scope of service to African farmers and businessmen from whom they only accepted deposits but were reluctant to advance loans (Maxon, 1992). Nevertheless, the exclusionary nature of formal financial services was already deeply entrenched into the sector, and efforts by the new Kenyan government to reform the inherited regime after independence by taking control of the monetary and fiscal policy, introducing a Kenyan currency and establishing state-owned community banks or buying out foreign banks yielded sluggish results.

In the meantime, native Africans developed informal mechanisms to manage fiat money. As the indigenous way of life was inherently communal, corresponding cultural values and practices were carried forward into currency management, particularly the reliance on *chamas*, or informal groups—which Bouman (1983, p. 268) described as “the poor man’s bank”—to facilitate saving, borrowing and insurance. The semi-coherent networks of informal financial groups and households, and the informal indigenous institutions that governed their behaviour constituted the informal regime. Nomadic and remote communities however remained completely excluded from either the formal or informal regime.

Things starting to change in Kenya in the 1980s due to the emergence of the microfinance trend. The international donor community responded by supporting non-governmental microfinance agencies such as the Kenya Rural Enterprise Programme (K-REP), Kenya Women Finance Trust (KWFT) and Faulu Kenya (Hospes, Musinga, & Ong’ayo, 2002), and developed and tested various microfinance models. This microfinance movement debunked the myth that the poor are incapable of saving and making investments due to erratic and low-volume incomes. Another important landscape development—the launch of the Millennium Development Goals in 2000 mandating governments and the private sector to address poverty and social exclusion, exerted pressure on the formal regime to extend services to the poor, and motivated further expansion of microfinance options.

By the start of the new millennium, the formal regime had sedimented around market-oriented commercial banking as the primary guiding principle. The Central Bank of Kenya strictly regulated 46 banks located in cities and large towns based on regulatory standards focused on efficiency and competition, financial risk management and sector stability. These standards represented core rules of the formal regime. The formal regime was supervised by various global regulatory bodies, among them the Swiss-based Basle Committee of Banking Supervision which promulgated new minimum capital requirements for banks in 1988. Such landscape-level regulatory forces influenced national and firm-level strategies for providing financial services, e.g. by limiting avenues for serving low income market segments due to the (then perceived) high risk profiles they carried. These developments also favoured industrialised economies and wealthier households in developing countries, and as a consequence, poor countries and households were further disenfranchised.

Landscape developments in global finance were accompanied by developments in information and communication technologies. Early in the 2000s, the launch of the World Wide Web and spread of internet connectivity introduced new transactional protocols in formal financial services, e.g. ATM networks, internet banking, credit and debit card facilities, and real-time interbank connectivity. These services entrenched the use of electronic payment mechanisms in the sector, which in Kenya culminated with the introduction of the real-time gross settlement system (RTGS) in 2005, an *incremental improvement* of the existing funds transfer system. As formal finance increasingly relied on information technology, expansion of the banking network beyond urban areas where supporting infrastructure such as electricity and broadband internet existed became difficult. The 2006 FinAccess Survey reveals that the usage of formal financial services was twice as high in urban areas (at 32.0 percent) as in rural areas (14.6 percent). Formal finance was also used largely by high and middle income households relative to poorer households

in the informal regime. 23 percent of unbanked individuals attributed not having a bank account to their inability to afford to maintain it.

Despite technological, policy, market and cultural lock-ins in the sociotechnical system, *tensions* within the formal regime began to appear. The pressure to prioritise poverty alleviation and social inclusion arising from the MDGs, the microfinance movement and the national development strategy Vision 2030 weighed on the Kenyan government, and by extension, the Ministry of Finance and Central Bank of Kenya to prioritise financial inclusion. Extending formal finance to the poor presented a significant regulatory dilemma: balancing potential institutional innovations against financial sector stability and security pursuant to Basle III requirements. Further tension rose from the inability of commercial banks to respond to the new mandate to serve the poor due to business models that could not effectively support high-volume micro-transactions and spatially limited infrastructure.

New landscape developments poised to take advantage of the window of opportunity created in the system instead sprang from the telecommunications sector. In the period between 1998 and the early 2000s, the telecommunications industry in Kenya had undergone substantial reform that stimulated the entry of and competition among several mobile operators into a previously monopolistic sector. As a consequence the cost of mobile phone services dropped significantly, and by the end of 2006 the number of mobile subscribers had grown to 9.3 million (CCK Annual Report, 2007-2008)<sup>5</sup>. Competition in the sector stimulated innovation, and one of the value-added services<sup>6</sup> introduced into the sector was airtime-sharing services: Me2you from Zain Kenya Ltd and Sambaza from Safaricom Ltd<sup>7</sup>. These airtime-sharing services are seen as a precursor to the mobile money platform subsequently developed in the same year, as customers used these services as a rudimentary money transfer system (Jack & Suri, 2011).

#### *The beginnings of the mobile money niche (2003-2007)*

In response to the MDG's call for private-sector participation in poverty alleviation in developing countries, Vodafone UK—which part-owns Safaricom Ltd, the largest mobile operator in Kenya—ventured to develop a technological solution to financial exclusion. Vodafone in 2003 won a £1 million matched award from the Financial Deepening Challenge Fund (FDCF), a programme by the U.K. government's Department for International Development (DFID). The establishment of a mobile money niche was marked by the start of open brainstorming workshops in 2003, spearheaded by Vodafone in Nairobi and Dar es Salaam. The workshops which involved different types of actors<sup>8</sup> were used as opportunities for *learning* about local challenges in financial services. The *network of actors* eventually gravitated into a partnership between Vodafone UK, Safaricom Kenya Ltd, Faulu Kenya—a microfinance organisation previously involved in developing new models of informal finance, and Commercial Bank of Africa. At the outset, expectations were articulated towards providing solutions for microfinance loan repayment. Several product propositions were considered and abandoned due to feasibility issues, among them the use of Point of Sale systems and magnetic stripe cards to facilitate payment. Eventually, expectations “firmed up around the design and test of a platform that would allow a customer to receive and pre-pay a small loan using his or her [mobile] handset”, according to a Vodafone executive (Hughes & Lonie, 2007, p. 68). Additionally, the novelty had to be frugal and easily accessible

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<sup>5</sup> 9.3 million mobile subscribers was about 56% of the adult population. Safaricom Ltd controlled 72% of the market

<sup>6</sup> The core business of mobile operators was voice, SMS, and eventually data (mobile broadband). Other services not categorised in these classes were referred to as value-added services.

<sup>7</sup> Kamau, Macharia 2010, 'Zain woos subscribers with value added services', The Standard, 10 August. Available from <http://www.standardmedia.co.ke>. [28 October 2013].

<sup>8</sup> Participating actors included banks, microfinance organizations, technology services suppliers, nongovernmental organizations with an interest in micro-credit, and representatives from the telecoms and finance sector regulators

among the poor. An SMS-based application named M-Pesa was developed based on basic mobile phones. M-Pesa was then pilot tested among low-income users over a period of 7 months between October 2005 and May 2006. The test resulted in numerous product improvements made before national launch in March 2007. In the period leading up to the launch, Vodafone and Safaricom negotiated M-Pesa's fit with prevailing regulatory rules, for instance, its compliance with fraud and anti-money laundering guidelines, and customer deposit protection.

M-Pesa was launched in 2007 under the key customer proposition Send Money Home, which exploited the norm of making frequent remittances through familial social networks. Subscriptions reached 1.3 million users by the end of the year. This rapid growth occurred both in the formal and the informal regimes, and as a result, M-Pesa began to formalise money transfers occurring across the regimes. Actors and institutions in both the formal and the informal regimes reacted to the launch and dramatic uptake of the service in different ways, creating new dynamics within and across regimes.

#### *Hollowing out of the formal and informal regimes (2007 – 2013)*

Between 2007 and 2013, M-Pesa subscription grew from 5.1 million to 17.1 million registered users, supported by an agent network of 65,547 (Safaricom, 2013). The business model diffused across the telecommunications sector in Kenya as other mobile operators entered the mobile money market: Zap by Zain Kenya in 2009<sup>9</sup>, YuCash by Essar in 2009, Iko Pesa by Orange in 2010 and Tangaza Pesa by Mobile Pay Ltd in 2011. Cumulatively, mobile money subscription reached 26.2 million registered subscribers in 2013, i.e. about 82 percent of the adult population. However, Safaricom's M-Pesa continued to dominate the market. By 2013, 17,000 agents supported mobile money, surpassing the total number of Postbank branches, post offices, bank branches and automated teller machines by nearly five times (Mas & Radcliffe, 2011). An equivalent of 15 percent of Kenya's gross domestic product (GDP) worth of person-to-person transactions was conducted via mobile money.

Due to the breakthrough of M-Pesa, hollowing out at the meso-level manifested through dramatic disturbances in market segmentation across the formal and informal regimes, preferences and behavioural norms among the banked and the unbanked, banking sector policy in the formal regime, innovation agendas in several sectors in the economy, and the general configuration of social groups and networks of actors in the system.

With respect to market segmentation, it is evident that M-Pesa adoption brought about a redistribution of households across the formal and informal regimes, and a blurring of the boundaries between these regimes (see Figure 2 for an illustration). Proportions of households incorporating mobile money into their financial management practices increased. As a consequence, households exclusively relying on either formal or informal services reduced progressively such that by 2013, those that used formal services only dropped from 12 percent to 3 percent, while informal only dropped from 33 percent to 9 percent. Participation in the formal regime however increased from 28 percent in 2006 to 64 percent in 2013 as more unbanked people opened bank accounts, hence expanding the scope of the regime. In contrast, participation in the informal regime decreased from 49 percent in 2006 to 42 percent in 2013 as people migrated from *chamas* to mobile money and formal financial services, resulting in the shrinking of the informal regime. In interviews, members of informal groups reported substituting M-Pesa for regular *chama* meetings, and borrowing directly from friends and family on their mobile phone network rather than from the *chama*. Additional multi-regime dynamics are evident through blurring regime boundaries. Households increasingly straddled financial services available in both the formal and informal regimes. For instance, there was an increase in households that simultaneously used bank accounts, *chamas* and mobile money services (29 percent), and those that combined bank accounts and mobile money (30 percent). Interestingly, by 2013 only 2.2

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<sup>9</sup> Rebranded Airtel Money in 2011

percent of households combined mobile money and *chamas*. Proportions of absolutely excluded households reduced from 39.3 percent to 25.4 percent.

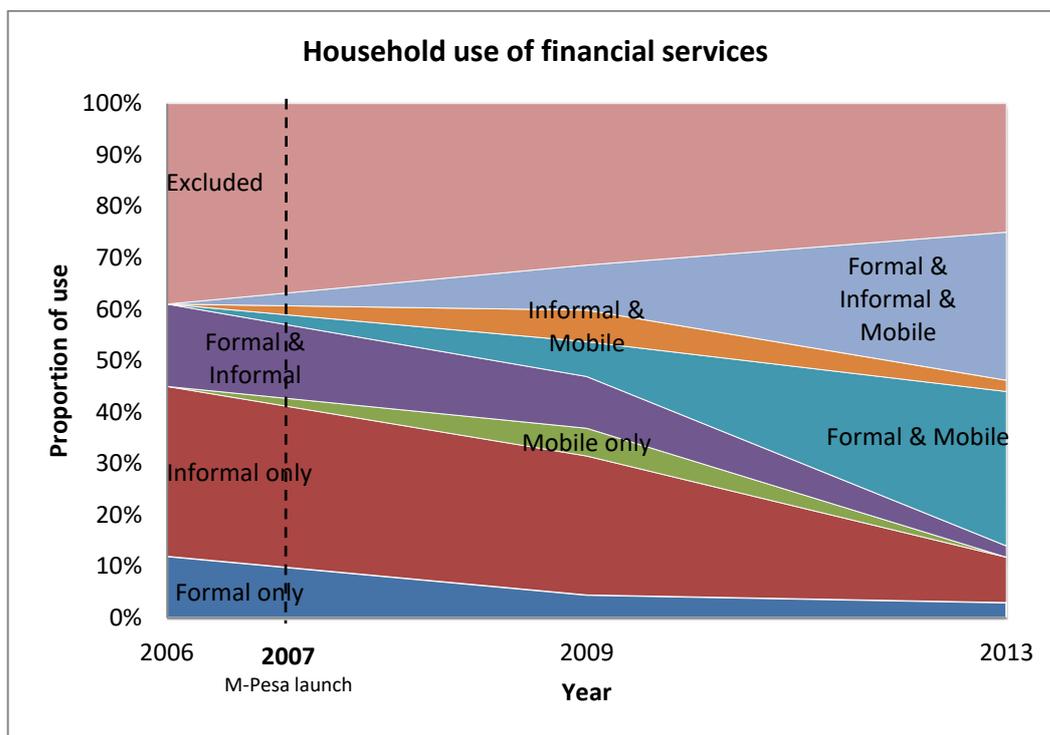


Figure 2. Area graph presenting data on the shift in the use of financial services before and after the launch of mobile money technology in 2007.

While the proportion of excluded users reduces progressively in 2009 and 2013, there is a gradual erosion of boundaries between the formal and informal regimes as users adopt mobile money. Households increasingly participate in multiple regimes.

Source: Own computations from FinAccess National Household Surveys

In the period immediately after M-Pesa launch (2007-2009) however, competition between M-Pesa as the novelty and the incumbent banking platforms in the formal regime was fierce. Growth in commercial banking was negligible, a phenomenon that incumbent banks reacted to aggressively especially when their customers started to divert funds from their bank accounts to their mobile money accounts (Kendall, Maurer, Machoka, & Veniard, 2011). As a consequence, M-Pesa faced contestation from commercial banks which cited fraud and money laundering as risks to financial sector stability posed by M-Pesa diffusion. An article in *The Nairobi Star*, a local newspaper, headlined “Big Banks Plot to Kill M-Pesa”<sup>10</sup> reported that four large banks formed an ad hoc committee to try and get M-Pesa stopped, pitching to the Minister of Finance that M-Pesa is similar to a ponzi scheme. At the same time, the banking sector lobby—Kenya Bankers Association (KBA)—pressured CBK to audit the legal structure of M-Pesa with the expectation that it would be regulated under the prudential guidelines for commercial banking.

Such regulation would effectively homogenise it with banks. The Minister of Finance ordered CBK to “study the scheme and pronounce policy to safeguard depositors”, stating: “We want to protect wananchi from the sharks who want to make money from the misfortune of

<sup>10</sup> Mbugua, J.: Kenya: *Big Banks in Plot to Kill M-PESA*. *The Nairobi Star* (December 23, 2008), <http://allafrica.com/stories/200812230962.html> (accessed 01/02/2017)

others”<sup>11</sup>, further creating uncertainty about M-Pesa at the regime level. CBK and the National Treasury proceeded to conduct an in-depth audit and legal evaluation. The audit established that M-Pesa services were distinct from banking since 1) M-Pesa does not accept deposits that are repayable on demand, or accept money for current account purposes that is used for payment to cheques, or lend or invest customer funds and therefore no related risks are inherent; 2) customer funds are held in a trust in one of the leading banks; 3) there are no credit risks as M-Pesa agents prepay funds to replenish their floats before transacting with customers. Further, CBK and the Treasury in a public circular committed to regularly monitor risk factors associated with the platform, and declared M-Pesa as trustworthy. In so doing, CBK quelled contestation from incumbent formal regime actors and restored public confidence in mobile money services. Subsequently, CBK adopted an “experiment first, then regulate” approach (Mas & Ng’weno, 2010, p. 355), and expanded its mandate to create an enabling environment that welcomes innovation in the banking sector. While launching a mobile phone banking solution, the CBK governor “urge[d] the banking sector to seek innovative ways of leveraging on existing technologies and infrastructures to provide affordable and inclusive financial services to Kenyans”<sup>12</sup>.

In order to remain relevant, commercial banks<sup>13</sup> redesigned their accounts to become cheaper to operate by lowering or eliminating account opening costs, transaction costs and ledger fees, and undertook a wave of branch opening in new rural and low-income locations where M-Pesa adoption had demonstrated a market potential (Johnson, 2012 Financial landscapes). By 2009, data from the FinAccess survey showed that 75 percent of the urban population cited mobile money agents as the closest financial service provider, rather than commercial bank branches or ATMs.

A significant landscape shock that cemented M-Pesa’s legitimacy in the evolving formal and the informal regimes was the 2007-2008 post-election crisis in Kenya. Chronic political instability and civil unrest in January 2008 followed the disputed presidential and parliamentary election. The unrest caused the shutdown of all formal financial services for one week, resulting in a chronic shortage of cash in urban areas and in violence-ridden rural areas in the country. M-Pesa as a mobile phone-based service provided the only channel for money transfer to isolated and displaced communities in rural areas and to besieged urban areas. For the first time since M-Pesa launch, the volume of transfers from rural to urban areas rose sharply as rural families made remittances to support their urban counterparts during the crisis (Morawczynski & Pickens, 2009). The recession that followed the election brought a resurgence of informal finance in rural areas, where newly formed informal groups served a dual purpose: communal support for displaced families to establish small businesses as a source of livelihood, and to aid reconciliation efforts to quell political tensions in communities (Langat, 2014).

Many policy changes occurred in the formal regime in the period after M-Pesa launch, and there was a clear shift in policy priorities from a heavy focus on financial sector stability and a minor focus on financial inclusion to a balance of the two. Central Bank of Kenya speeded up the release of the Microfinance Act (2006) to regulate credit services and payments occurring within the microfinance sphere in which M-Pesa was pilot-tested. It also exempted value added tax on all financial services in 2009 to further lower customer costs<sup>14</sup>. New agency banking guidelines that

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<sup>11</sup> Wahome, M.: *M-PESA under investigation*. The East African (December 9, 2008), <http://www.theeastafrican.co.ke/news/2558-500218-v0rfibz/index.html> (accessed 01/02/2017). At the time, pyramid schemes had proliferated in Kenya and many people had lost money in these schemes. M-Pesa faced the risk of being bundled together with pyramid schemes both from a policy and user perspective.

<sup>12</sup> Ndung’u, N., Governor of Central Bank of Kenya remarks at the Launch of Equitel Bank mobile banking service, September 3, 2008.

<sup>13</sup> Equity Bank, Family bank and Cooperative Bank

<sup>14</sup> However, the government introduced a 10 percent excise duty on fees charged for money transfer services, and it applied to mobile phone providers, banks, and other money transfer agencies. This tax was

would enable banks to operate an agent network similar to M-Pesa's networks were released in 2009. Additionally, a raft of new legislation and regulatory measures setting parameters for mobile banking, regulating electronic money transfer, instituting anti-money laundering guidelines and restructuring the national payments system were debated in public and in parliament, and passed into law. Two landscape factors influenced this tightening of regulatory frameworks in the financial services industry in Kenya: the 2008 global financial crisis in which stricter regulation at the global and local level was widely seen as a remedy, and the issuance of Basel III Principles for Sound Liquidity Risk Management and Supervision in 2009 which recommended new liquidity levels in formal finance to ensure financial stability.

From 2009 onwards, new networks of actors centred on M-Pesa and other mobile money providers formed in both the formal and in the informal regime. First, commercial banks formed alliances with mobile operators to integrate mobile money services to traditional banking services. The most celebrated alliance was between Safaricom's M-Pesa and Equity Bank, the bank with the largest customer base in Kenya. This partnership—referred to as “the financial inclusion holy alliance” by GSMA<sup>15</sup> due to their focus on the unbanked—launched M-KESHO, a cobranded suite of financial products<sup>16</sup>. By 2013, all commercial banks had integrated mobile money services in their products. Other notable alliances included M-Pesa and Visa and Mastercard, and M-Pesa and Western Union to facilitate international money transfers.

At the niche level, the combination of landscape pressures for social inclusion and the success of M-Pesa at the regime level—which yielded positive expectations on mobile phone-based solutions—gave rise to a deluge of foreign and local investments into mobile phone-based innovation in Kenya. New pay-as-you-go initiatives experimenting on new forms of social inclusion using M-Pesa resulted in the formation of new and larger networks of actors. One such initiative was the not-for-profit Grundfos LIFELINK water project<sup>17</sup> managed by Danida, the United Nations, the government of Kenya, World Vision and Red Cross. 40 demonstration projects implemented in Kitui District in 2009 explored sustainable rural water supply models in which households paid for safe water using M-Pesa. Another initiative is M-KOPA Solar, a pay-per-use model for solar-based energy provision to off-grid customers using M-Pesa and other mobile money services to collect revenues<sup>18</sup>. Mobile money was seen as providing the most efficient and cost effective transactional rail for overlaying myriad services for widely dispersed and geographically remote households. Further, the differentiation between similar mobile money products into more distinct business models becomes clearer: the mobile network operator model, for instance M-Pesa, the bank-led model for instance Equity Bank's mobile virtual network named Finserve Africa, and the independent model for instance Tangaza Pesa by Mobile Pay Ltd.

#### *Dynamic stability of the new regime*

At the end of 2013, diffusion of mobile money services stabilised at approximately 26 million registered users. M-Pesa is now considered the world's most successful mobile money transfer service<sup>19</sup>, and is operational in seven African countries. An article by The Economist Intelligence

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passed on to the consumer. The value of M-Pesa payments reduced marginally as a consequence. See <http://www.cgdev.org/blog/taxing-kenya%E2%80%99s-m-pesa-picks-pockets-poor>

<sup>15</sup> GSMA blogpost, M-KESHO in Kenya. <http://www.gsma.com/mobilefordevelopment/m-kesho-in-kenya>

<sup>16</sup> M-KESHO was eventually abandoned by both companies due to profit-sharing disagreements. <http://www.businessdailyafrica.com/M-Kesho-growth-stalls-over-hitch-on-profit-sharing--/-/539552/1373474/-/8e1xlj/-/index.html>

<sup>17</sup> Grundfos Lifelink projects in Kenya: <http://www.grundfos.com/cases/find-case/grundfos-lifelink-projects-in-kenya.html>

<sup>18</sup> M-KOPA Solar: <http://solar.m-kopa.com/about/company-overview/>

<sup>19</sup> In a Brookings Financial and Digital Inclusion scorecard that covered multiple countries, Kenya scores the highest, i.e. 89 percent of total possible points (Villasenor, West, & Lewis, 2015)

Unit suggestively titled “Out of Africa, into Romania”<sup>20</sup> signifies the niche-landscape influence of M-Pesa as it started to be rolled out in countries outside Africa, i.e. India (2013), Romania (2014) and Albania (2015). Further niche-landscape influences are apparent in the establishment of global niches where voluntary “multinational financial inclusion-oriented networks” are formed (Villasenor, West, & Lewis, 2015, p. 3), providing spaces for policy makers in developing countries to learn and share knowledge towards enhancing access to basic financial services, and set quantifiable targets to drive progress towards financial inclusion. In these forums, mobile money is considered central to country-level programmes, and M-Pesa’s role in Kenya’s success in extending digital financial services to the unbanked is used as the exemplar. Examples include the Alliance for Financial Inclusion—a global knowledge-sharing network for financial inclusion policymakers from 89 member states, Better than Cash Alliance (2012) composed of 14 developing country governments, private sector actors and philanthropic foundations seeking to transition to electronic payments, and G20 Financial Inclusion Peer Learning Program (2012). Additionally, numerous explicit and implicit mentions of using mobile money technologies were made during the post-2015 Sustainable Development Goals summit sub-meeting Digitising Payments and Inclusive Finance to Achieve the Sustainable Development Goals (Digital Currency Council, 2015)<sup>21</sup>. Mobile money is widely considered as a promising avenue for promoting financial inclusion in the developing world.

At the regime level, integration of the formal and the informal regimes continues. Consumers with bank accounts are forming *chamas* to manage their investments in more sophisticated instruments such as real estate, the stock market and offshore opportunities. Informal groups on the other hand continue to formalise their operations by relying on mobile money and formal bank accounts, and diversifying beyond pooled savings into real estate investments. Mobile money now supports seamless remittances across pre-existing financial devices. As this is an on-going transition, the potential for incremental innovation and further reconfiguration still exists.

#### 4. Case analysis from the Inclusive Innovation Perspective

In this section we recast the M-Pesa case through the LII, highlighting how different (higher) levels of inclusion were achieved.

##### *Level 1/ Inclusion of Intention*

M-Pesa was born out of the aspiration to foster financial inclusion by deepening the financial sector. By 2006, only 26 percent of the Kenyan adult population had access to formal financial services provided by commercial banks, microfinance institutions, SACCOs and other prudentially regulated institutions, while 32 percent used informal financial services. 39.3 percent was absolutely excluded from any form of financial service, formal or informal. Thus, the unbanked made up 74 percent of the population. Our analysis of data from the FinAccess National Surveys reveals that the unbanked were located in low-income urban areas and rural areas where, apart from a deficiency in formal financial services, there was a deficiency in other infrastructure such as grid electricity, piped water and mobility systems. In addition, the unbanked consist of a higher proportion of households run by women, and these households relied on subsistence farming or were dependent on financial or resource contributions from members in their social networks. Their median monthly income ranged between \$11 and \$30, and they had relatively lower levels

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<sup>20</sup> The Economist Intelligence Unit. *Out of Africa, into Romania*. (May 13, 2014)

<http://www.eiu.com/industry/article/1451806929/m-pesa-out-of-africa-into-romania/2014-05-13>

<sup>21</sup> Babcock, L.: *What Do the UN's New Sustainable Development Goals Mean for the Blockchain?* (September 18, 2015) <https://www.digitalcurrencycouncil.com/professional/what-do-the-uns-new-sustainable-development-goals-mean-for-the-blockchain/>

of educational attainment. Figure 3 summarises these multidimensional characteristics of the unbanked vis-à-vis the banked.

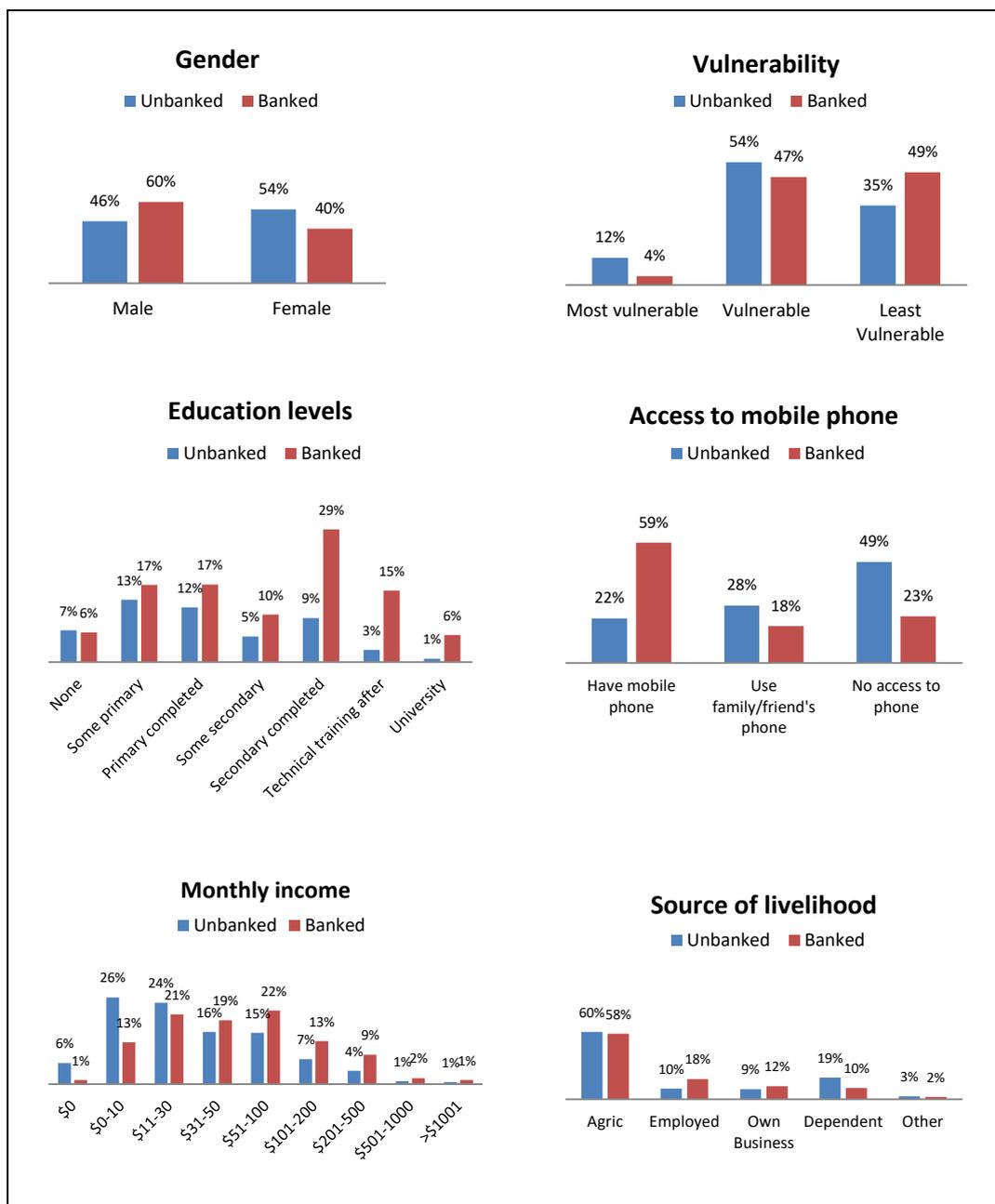


Figure 3. Bar graphs differentiating the characteristics of the unbanked vis-à-vis the banked. Vulnerability refers to the frequency with which households go without enough food to eat: the most vulnerable often go without food. Data for gender, education levels and age groups are from the 2006 FinAccess Survey. Data on livelihood, income groups and vulnerability are from the 2013 FinAccess Survey.

While their lack of access to banking services was in itself harmless to households, and some households did not consider such services as inherently important<sup>22</sup>, such instrumental

<sup>22</sup> 62% of the unbanked believed that “you can easily live your life without having a bank account”, while 47% believed that “banks take advantage of poor people”

exclusion led to capability deprivations that prevented them from optimally participating in economic activity at the local and national level, and limited their own opportunities for income growth. This exclusion was further entrenched by prudential regulations from the Central Bank of Kenya that gave little room for commercial banks to extend banking products for the poor. As a consequence, these communities were passively excluded by policies that inadvertently limited participation of the poor in formal financial services.

Vodafone UK undertook an initiative to provide a solution for the unbanked alternative to commercial banking. Their aspiration to address social exclusion in financial services is evidenced by their effort to acquire capital from the U.K. government's DFID Financial Deepening Challenge Fund (FDCF) aimed at financial inclusion projects. Vodafone's Head of Social Innovation described the target population segment as "customers who were unbanked, unconnected, often semi-literate, and who faced routine challenges to their physical and financial security" (Hughes & Lonie, 2007, p. 69), categorically stating that "we were specifically targeting the unbanked" (p.69). The outcome of this initiative was M-Pesa, a mobile phone based money transfer platform launched in Kenya in 2007.

In the period leading up to and immediately after the launch, M-Pesa faced objection from commercial banks which demanded its regulation as a financial institution under the Banking Act. The Central Bank of Kenya however shielded M-Pesa development and roll-out, citing financial inclusion as the higher immediate objective over the interests of the banking sector.

Therefore it is clear that from the outset, M-Pesa was developed with the intention to include the marginalised. As we shall see in the next section, the business model and the platform were designed and developed with the needs of the excluded in mind, thus confirming that the intent to include was the overarching guiding principle.

### *Level 2/ Inclusion of Consumption*

To ensure that the platform was accessible and user-friendly for the unbanked as the target market, the developers took into account their social-economic circumstances, lifestyle and environment. The unbanked normally used or had access to a basic SIM-based mobile handset, lived greater distances from brick-and-mortar bank branches<sup>23</sup>, spoke Swahili and vernacular languages, and normally conducted high-volume, low-value transactions. Therefore, any technological solution needed to account for these factors. M-Pesa was designed as a simple, menu driven, SMS-based application that would run on the SIM toolkit, available in both English and Swahili, to be supported by small outlets and kiosks as agents in trading centres in rural areas and low income urban areas (Hughes & Lonie, 2007).

Within three years of launch, the service had over 10.3 million registered users. Half of the 17,700 M-Pesa agents in operation were located outside urban centres. Notably, M-Pesa was initially widely adopted by the banked during the Send Money Home marketing campaign run by Safaricom Ltd to stimulate cash transfers from urban high-income individuals to their relatives and friends in rural areas. However, the service spread to poorer households in remote areas over a short period of time. Jack and Suri (2014) in their survey of 3,000 randomly selected households across Kenya found that their proximity to mobile money agents grew fourfold between September 2008 and December 2009. Data from the 2015 FinAccess Geospatial Mapping Survey reveals that 73 percent of Kenyans lived within a three kilometre radius of a financial services outlet, and 78 percent of these outlets are mobile money agents.

Jack and Suri (2011) show that M-Pesa's reach down the socio-economic spectrum is reflected along a number of dimensions. First, the share of M-Pesa use among unbanked households steadily increased, doubling from 25 to 50 percent between 2008 and 2009. Second, while the representation of all segments of the income distribution in the profile of users has grown, the proportional growth has been highest among those at the bottom. Third, the

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<sup>23</sup> In the 2006 FinAccess Survey, 68% of the unbanked reported that the nearest bank was 'very far' away

representation of rural households, typically poorer and less integrated into the real economy also increased. While a predictably high share, three-quarters, of urban households used M-Pesa in 2009, the share of rural households using the service again doubled from just 29 percent in 2008 to nearly 60 percent in 2009. Similar patterns were observed with regard to educational attainment: better educated people were more likely to use M-Pesa, but growth was higher among the less-well educated. Finally, M-Pesa reach among women increased, such that the proportion of female users rose from 38 percent in 2008 to 44 percent by 2009. Jack and Suri (2011) further argue that M-Pesa's pattern of technology adoption mirrors that of other product and service innovations, which are often first used by the better-off. However, the speed at which the service has reached less well-off users and their apparently high valuation of it is unprecedented, especially in the developing world.

Due to its adoption among the unbanked and its use among the banked, M-Pesa has contributed tangibly towards promoting financial inclusion and deepening of the financial sector in Kenya.

### *Level 3/ Inclusion of Impact*

As M-Pesa diffused among the banked and the unbanked, its impacts began to be felt across both domains. Economic impacts among rural communities and the urban poor are especially palpable. Firstly, the use of M-Pesa minimised the vulnerabilities and negative impacts of financial shocks arising from events such as crop failure, illness, job loss or violence that poorer households are particularly susceptible. M-Pesa use enabled such households to smooth consumption through access to credit and insurance from their social networks on the platform (Jack & Suri, 2014). A Financial Diaries study revealed that M-Pesa enabled poor households to make micro-savings more effectively, and plan for short-term consumption needs in a manner previously difficult to achieve through mattress-banking (Zollman, 2014). The same study also showed that mobile money use reduced the proportion of low-risk, low-return assets held by households for precautionary purposes such as jewellery, enabling them to invest in potentially higher risk but higher return assets such as a small business or agricultural equipment, which potentially provide overall long-term income enhancing impacts. In addition, M-Pesa enabled such households to diversify sources of income e.g. from remittances from friends and relatives that would otherwise be difficult to access due to lack of money transfer mechanisms (Malkamäki, Johnson, & Nino-Zarazua, 2009). Low-income households reported income increased by as much as 30 percent from transfers from people in their social networks (Morawczynski & Pickens, 2009). Another study showed that due to higher disposable income, registered users of M-Pesa had average daily expenditure 67 percent higher than those not using the service (McKay & Pickens, 2010).

A study conducted in Kibera, the largest urban slum in Kenya, and Muranga and Kitui, two rural districts, revealed additional economic impacts of M-Pesa: the expansion of the local economy through increased money circulation and local employment; increased physical, financial and food security; an enabling of financial, human and social capital accumulation; and ease in transactions and increased quality control in the business environment (Plyler, Haas, & Nagarajan, 2010). M-Pesa increased the volume of money flowing in and out of these communities, speeding up money velocity which boosted local consumption. As a consequence, there was an increased volume and variety of food and agricultural inputs in local markets thus bolstering food security. More youth and women found employment in the rapidly expanding agent network as businesses became M-Pesa agents in addition to their core business. In terms of physical security, users reported reduced muggings and thefts, and women reported being able to use M-Pesa to accumulate cash securely.

While the impact of M-Pesa among the poor are dramatic, M-Pesa has also positively impacted the 'banked', providing them with an alternative fast, convenient money transfer and m-banking alternate or complement to formal bank accounts.

#### *Level 4/ Inclusion of Process*

Here we evaluate the inclusivity of the M-Pesa innovation process. At the conception stage, inclusivity is evident in Vodafone's involvement of multiple actors during the initial effort to understand local challenges and search for a feasible solution. M-Pesa was then conceived in collaboration with several local organisations: the local Vodafone affiliate, the microfinance institution and a local bank. Later, participation of the unbanked during the product development process helped to establish the feasibility of the business model and the technological choices.

Users were first invited into the innovation process at the first trial of the M-Pesa prototype. The original design proposition was a platform that enables customers to receive and repay microloans to microfinance institutions using their mobile handset. The microfinance institution Faulu Kenya provided the first set of 500 pilot-test users (Hughes & Lonie, 2007).

Through participation of this subset of potential M-Pesa adopters, the M-Pesa team learned about the differentiation of users according to mobile phone literacy, the importance of user training, and ways to simplify the complexity of transactions built into the platform. As users familiarised themselves with the technology and transaction procedures, they creatively carried out new procedures on the platform not initially envisioned, for example repaying loans on behalf of other clients in return for services rendered, paying for goods and services, using M-Pesa as an overnight safe for cash, etc. This entrepreneurial behaviour showed M-Pesa's potential for opportunities for innovation beyond the bounds of microfinance. It was more revolutionary as a money transfer system than as a credit disbursement and repayment system. Consequently the microfinance proposition and Faulu Kenya as a main actor were abandoned and M-Pesa took a new turn to remittances services. These new user applications were subsequently incorporated into the M-Pesa platform, thereby initiating an iterative process of user innovation and M-Pesa product improvements and extensions before and after the official launch. After launch, for instance, value-added services such as bill payments and saving products were introduced on the platform after Safaricom Ltd noticed that users were using M-Pesa to make payments in retail stores and saving money on the platform.

The distribution of M-Pesa through small businesses located in low-income urban areas and rural areas acting as M-Pesa agents is a further manifestation of user involvement. These businesses were run by the individuals in the excluded segment, and these entrepreneurs interacted intimately with potential users in their localities, thereby providing useful feedback to Safaricom during the roll-out of M-Pesa.

It is clear therefore that M-Pesa's innovation process was inclusive to the extent that the excluded were consulted and collaborated in the development of the business model during the design, development, and distribution phases of the innovation process. However, as product development was entirely owned by Safaricom and Vodafone, and Faulu Kenya initially, users had no direct controlling stake in the trajectory of development.

#### *Level 5/ Inclusion of Structure*

Prior to the development and launch of M-Pesa, the financial services sector was fundamentally exclusive, as it only catered to the needs of middle- and high-income well-educated households in urban areas. In fact, the excluded were not considered as potential actors in the formal financial services sector due to their low income levels and frequent low-value transactions, thus the lack of incentives to develop products tailor-made to their needs. Commercial banks limited the participation of the poor through unaffordable minimum requirements to operate a bank account such as minimum opening balances, the maintenance of a minimum operating balance, demonstration of a regular source of income, etc. By design, these requirements were passively exclusionary.

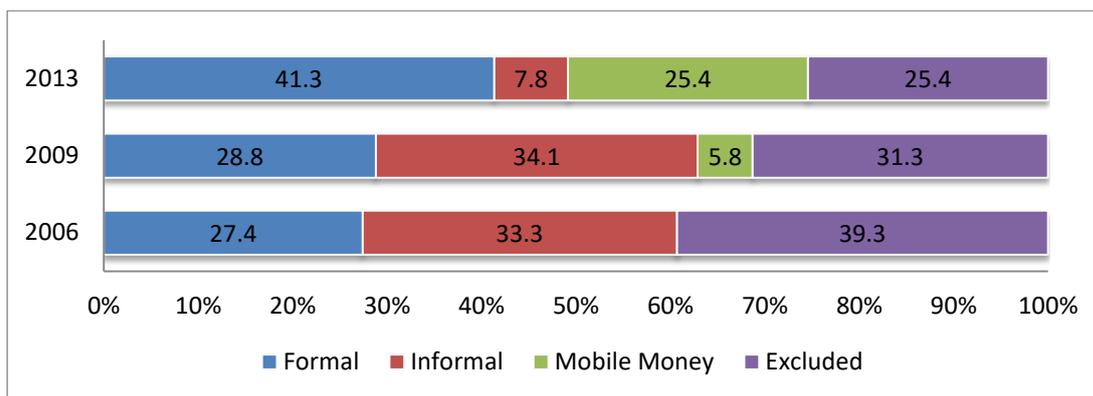


Figure 4. Graph presenting the restructuring of market segments in the financial services industry. The figures represent households exclusively using each of the financial services. Data are from the 2006, 2009 and 2013 FinAccess Surveys.

After the launch of M-Pesa in 2007, the proportion of households absolutely excluded reduced to 31.3 percent in 2009 and 25.4 percent in 2013, while the proportion of the banked increased from 27.4 percent in 2006 to 41.3 percent in 2013 (see Figure 4). The proportion of households relying exclusively on informal mechanisms of financial management reduced from 33.3 percent in 2006 to 7.8 percent in 2013 as they adopted M-Pesa and opened bank accounts. These numbers suggest that mobile money was more pervasively adopted by households using informal financial services than by the absolutely excluded. Therefore, although gains on financial inclusion were achieved to the extent that 64 percent of the population were now part of the formal financial sector, these gains were not equally distributed among those that were previously excluded from the formal sector. Thus, M-Pesa resulted in subordinated inclusion.

Data from the FinAccess 2013 survey reveals that the absolutely excluded are the poorest of the poor, i.e. the most vulnerable (9 percent of the population) and the vulnerable (50 percent of the population), i.e. those who “go without food often” and those who “go without food sometimes or rarely” respectively. This category of households lives below the poverty line, and often live in regions with limited coverage of both banking and telecommunication infrastructure as previously illustrated in Figure 3. These economic and infrastructural deficiencies, which are chronic in the northern parts of the country, are mirrored in the financial inclusion and exclusion maps in Figure 5. Additionally, the cost of owning and operating a basic mobile phone is prohibitive for households at the base of the pyramid, further preventing their participation in mobile money services. FinAccess 2013 data shows that only 15 percent of excluded households own a mobile phone. In their study of 800 households in this segment in Kenya, infoDev (2012) found that 20 percent of poor households made sacrifices to sustain their mobile phone subscription service by diverting as much as Ksh 72 (\$0.71 USD) weekly from food, clothes, utilities or bus fare. Over and above these basic subscription services, the transaction fee structure of mobile money services may also be unaffordable for the excluded. For instance, a \$1 USD cash withdrawal on M-Pesa carries an 11 percent fee, and the lowest withdrawal limit at an M-Pesa agent is \$0.5. While these values may seem low, they may be burdensome for a household subsisting on less than a dollar a day. Due to these factors, people in this segment may experience sustained exclusion even after the advent of mobile money. These observations draw attention to the deficiencies of M-Pesa as an inclusive innovation that have repercussions on the level of inclusivity achieved at a structural level.

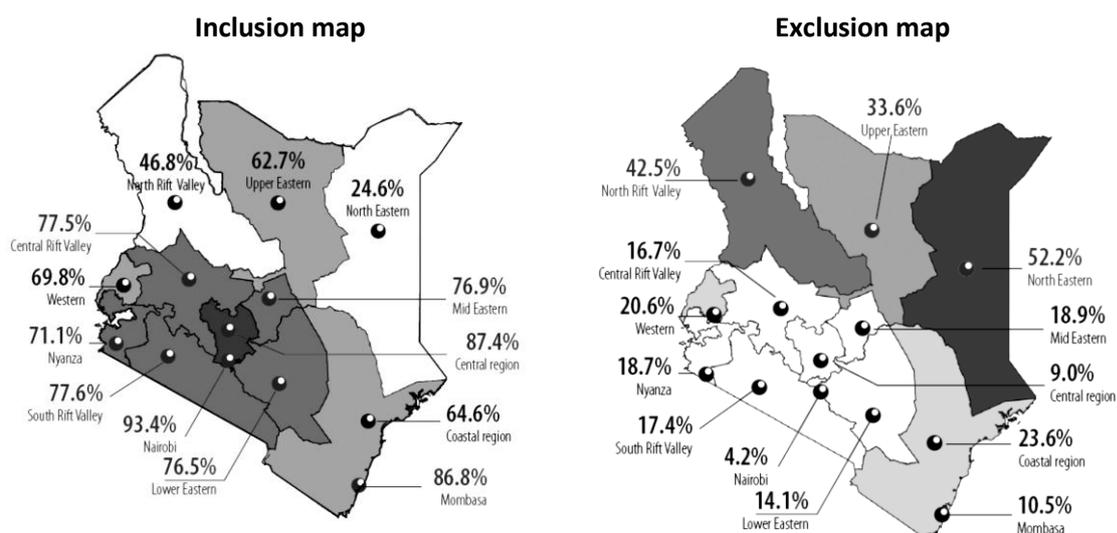


Figure 5. Maps presenting the levels of financial inclusion and exclusion in 2016. The darker areas of the map on the left represent higher levels of inclusion, while the darker areas on the map on the right represent higher levels of exclusion. The inclusion map shows that deeper levels of inclusion of up to 93 percent have been achieved in the western, southern and coastal parts of the country which have higher population densities and higher levels of urbanisation. Deeper levels of exclusion of up to 52 percent are prevalent in the Northern parts of country  
Source: FinAccess Household Survey Report (2016)

However, the development of M-Pesa as a technology for financial inclusion stimulated the opening up of the underlying financial services structure, and the prioritisation of the mission to *expand the access frontier*. By innovatively using existing technologies to extend services to the poor, M-Pesa demonstrated to incumbent actors that financial inclusion is an achievable objective. At the policy level for instance, reviews of the Banking Act, implementation of the Microfinance Act and drafting of the National Payment System regulations became motivated by the need to “create an enabling environment for these institutions to offer a wide range of financial services and products using a variety of innovative delivery channels to different segments of the population”<sup>24</sup>. Commercial banks have oriented their corporate strategies to capture the base of the pyramid market by lowering account operating costs and geographically expanding their banking infrastructure. For instance, the corporate purpose of the largest bank by customer base Equity Bank is to “transform the lives and livelihoods of our people socially and economically by availing them modern, inclusive financial services that maximize their opportunities” (Equity Bank Group Annual Report, 2014, p.1). Similarly, Kenya Commercial Bank, the largest by geographical reach in Eastern Africa, states that its sustainability long term strategy is to “promote financial inclusion in our region” (Kenya Commercial Bank Group integrated report and financial statements, 2014, p.15). This prioritisation of an inclusive agenda in formal financial services indicates the emergence of a more inclusive structure.

#### *Level 6/ Post-structural inclusion*

As seen in the preceding section, sustained exclusions in financial services in Kenya persist in the wake of mobile money. This raises the question of whether and how mobile money can address these exclusions, or whether there is need for pursuing a different trajectory of inclusive innovation to extend formal financial services beyond the reach of mobile money. Nevertheless, discourse at the structural level places the financial inclusion agenda centre stage, and this is

<sup>24</sup> Ndung’u, N.: Remarks of the Governor of the Central Bank of Kenya during the breakfast launch of Faulu Kenya as the first licenced deposit-taking microfinance institution in Kenya, Nairobi, June 16 2009.

evident in the rhetoric of the government and the Central Bank, private sector actors like commercial banks, and in civil society organisations such as not-for-profit organisations. We can therefore conclude that post-structural inclusion is an on-going process.

#### **4 Cross-fertilising the frameworks**

We have applied both frameworks independently to the case of mobile money innovation in the financial services industry Kenya to empirically elucidate potential areas for cross-fertilisation between MLP and LII. An important contribution of LII to MLP is that the former allows to analyse inclusions and exclusions of the niche and regime in a differentiated way. This leads to a better understanding of the transition dynamics and the level of social inclusion that will be attained. For example, it will be possible to assess the stability of the regimes in terms of its inclusive nature, but also whether niche processes are on their way to achieving an inclusive socio-technical system or triggering a transition to an inclusive society.

The progressive steps of inclusivity presented in the LII can be transported into MLP analyses in two ways: Firstly, matching steps in the ladder to phases in the transition pathway to inclusion. Treated as progressive steps towards social inclusion, the steps in the LII can be applied as milestones in the transition to measure progress associated with the development of a niche. For instance, if the niche expansion includes excluded groups but has had no measurable impact on their livelihoods, the transition process may be deemed incomplete from an inclusion perspective. In such a case, the LII would enable the identification of steps or phases that are pending to achieve higher levels of inclusion. Such an approach deliberately reorients the analytical exercise to social inclusion as the ultimate measure of successful system transformation. In the M-Pesa case, the novelty was designed for the unbanked (Level 1); was adopted by both the banked and the unbanked (Level 2) and had tangible effects on economic and social factors in the lives of the unbanked poor (Level 3); involved users in several steps in the innovation process (Level 4); and progressively resulted in a change in policy priorities and product development trajectories in commercial banking to cater for the needs of excluded (Level 5, on-going); and stimulated discourse in financial services at the local and global level to account for social inclusion in new development trajectories (Level 6, on-going). By evaluating these milestones in the context of MLP analysis, the on-going transition to financial inclusion in Kenya may be deemed successful. Secondly, the steps to inclusivity may be imported into MLP analysis by identifying the depth of social inclusion achieved at the point at which the new regime is put into place. The LII can thus be used not only to assess the potential for inclusion but as an ex post tool to gauge the achievement of inclusiveness resulting from unfolding transition dynamics.

The contribution of MLP to LII literature is that it provides a framework to analyse why and how innovations move up the ladder, and which role marginalised actors can play. Insights into key niche formation processes of learning, expectations and network dynamics will help to gain a deeper understanding of the shift from Inclusion of Intention (Level 1) to Inclusion of impact (Level 2), and Inclusion of consumption (Level 3). The MLP's formulation of sociotechnical change however also provides insights that may prove useful for the conceptualisation of structural reform as generally discussed in the inclusive innovation literature and presented in the LII. According to Heeks et al. (2013, p. 5), "deep inclusion requires that the underlying institutions, organisations and relations that make up an innovation system are inclusive. This might require either significant structural reform of existing innovation systems, or the creation of alternative innovation systems." Structural change is at the centre of sociotechnical transitions. As seen earlier, the notion of structure is elaborated through sociotechnical systems that consist of material and social elements such as policies, culture, markets and technologies which are interdependent, and co-evolve over time into stable configurations referred to as regimes. Sociotechnical transition, or structural reform, occurs when the rigidities and path dependencies

of regimes are overcome, causing a shift from one configuration to another. Deep inclusion therefore is achieved when previously exclusive regimes are replaced, transformed or reconfigured.

In sum, compatibilities between the MLP and the LII are summarised in Figure 6. Processes occurring during the first four levels of the LII align with processes at the niche level in the MLP. Level 5 of the LII, although in a reduced form, aligns with the regime level where structural change occurs. Level 6 may be aligned with the sociotechnical landscape.

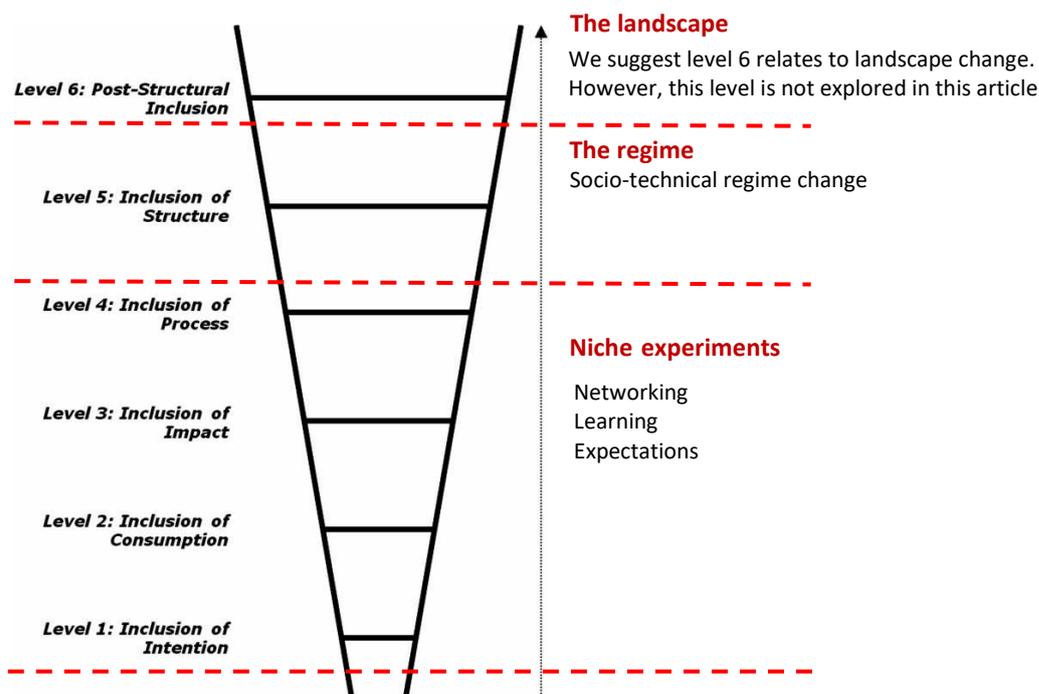


Figure 6. Recasting the LII over the three levels of the MLP

## 5 Conclusion

We began this paper seeking to understand why M-Pesa—and mobile money innovation in general—has led to a rapid financial services sociotechnical system change. Our analysis using the multilevel perspective of sociotechnical transitions has revealed that M-Pesa’s success is a result of a confluence of events and processes occurring over a long time in the incumbent financial services system that consisted of a formal and an informal regime. Over time, a multitude of pressures from different levels—which were fundamentally oriented towards social inclusion—were exerted on the incumbent system, among them the microfinance movement, the millennium development goals and the ICT revolution. Tensions arose within the incumbent system, some arising from incremental improvements in funds transfer systems, shifts in preferences, and changes in regulatory priorities. These tensions opened up an opportunity for the emergence of a mobile money innovation.

Still it is remarkable how fast the M-Pesa niche expanded, and transformed both the formal and the informal regime creating a new mixed regime. Such transition processes often take more time, often 50 years as it is argued in the transition literature. Here we see a change in 30 years if we include the rise of a microfinance niche, and only 15 years if we focus on mobile money

only. This fast transition can be explained when we take into account the fact that the confluence of landscape pressures, the opening up of the regime and the niche developed were entirely oriented to social inclusion. There is an additional factor, however. Regime actors exhibited a strong willingness to experiment with new technological and institutional configurations. Policy-makers were prepared to take a risk in an uncertain environment to achieve a social objective, and force commercial banks to do the same in order to survive the hollowing out of their business. Based on these outcomes we would like to suggest two propositions. For a rapid socio-technical system transitions, 1) it is necessary to have strong landscape pressures, an opening up of regime which makes regime actors willing to act and strong niche development all oriented towards the same goal, in this case inclusion. Inclusion was thus not only an outcome but also a factor in the process. In other words, transition might slow down or falter because a strong overriding orientation towards a similar direction is not present at all three levels; 2) for an inclusive socio-technical transition, regime actors must be willing to take significant risks and respond favourably to the mix of developments at all three levels. The motivation to take big risks is likely to be higher when regime actors have a normative interest in the social goal orienting the transition.

Further research on mobile money as an inclusive innovation could use these propositions to explore why the success in Kenya has not been replicated in other contexts with seemingly similar institutional environments. According to World Bank's Global Findex Database 2014, mobile money usage among neighbouring countries is notably lower: 37.07 percent in Somalia, 35.1 in Uganda, 32.36 in Tanzania, and 18.1 in Rwanda. In India and Romania where M-Pesa has been deployed, usage rates are 2.35 percent and 0.46 percent respectively. Despite deep mobile penetration, repeated efforts to launch M-Pesa in South Africa have been unsuccessful, while mobile money platforms in Nigeria have yet to break through (Villasenor et al., 2015). As landscape pressures to foster inclusion are similar across these countries, we hypothesise that the country-level dynamics at the micro- and meso-levels are different: regime actors are less oriented towards inclusion, and they have a low risk appetite to experiment with new technologies and new rules in the financial system. A case in point is the Nigerian Central Bank's bank-led approach that bars mobile operators from offering mobile money services (Guidelines on Mobile Money Services in Nigeria, 2015, p.4), and anecdotally this approach is faulted for limiting uptake of mobile money services<sup>25</sup>.

A final note about inclusion. We have established that M-Pesa is inclusive only to a certain extent. The extreme poor or vulnerable communities have so far been incapable of accessing mainstream formal financial services through mobile money due to the unaffordability of the service, the lack of capabilities to access and use mobile phone technology, and the absence of mobile money infrastructure in remote parts of the country. The bulk of these challenges are linked to systemic exclusion of rural communities that would be addressed via alternative policy interventions that enable the adoption of technology, for instance, provision of basic education and development of infrastructure for utilities like electricity and roads. The challenge to extending access using market-based inclusive innovations is to reduce the cost of access and ownership to enable participation of the extreme poor. Further research can explore whether the current regime is able to foster inclusion among extremely marginalised groups, or whether it is locked in the current level of inclusion, and thus needs another socio-technical system change for overcoming this barrier.

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<sup>25</sup> Llewellyn-Jones, L.: *Why mobile money transformed Kenya, but failed to take off in Nigeria*. (February 11, 2016) <https://iea.org.uk/blog/why-mobile-money-transformed-kenya-failed-to-take-in-nigeria> (accessed February 01, 2017)

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