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M-Pesa and the Role of the Entrepreneurial State in a Cashless Technology to Deliver an Inclusive Financial Sector

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Abstract

This article adds to case studies documenting the collaboration of private and state institutions in the construction of key modern technologies. Specifically, we contribute to the body of literature on the entrepreneurial state by documenting how state intervention in developing economies is not limited to capital-intensive projects and proven technologies but helps to develop markets and facilitate innovation and entrepreneurship, ultimately leading to economic growth. We revisit published sources in order to provide greater detail than previous studies on the role of state agents while also documenting how entrepreneurial states collaborate across borders. These ideas are exemplified by the evolution of state intervention in Kenya leading to the emergence of the world-recognized mobile payment service M-Pesa. The case of M-Pesa illustrates how public-private partnerships, the collaboration in the search for commercial opportunities by British and Kenyan governments, together with an enabling regulatory environment, facilitate technological innovation as a means of enhancing financial inclusion.

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Introduction

In a financialized economy, capital markets aiming for growth require innovation (Ismail Ertürk, Julie Froud, Sukhdev Johal, Adam Leaver, and Karel Williams 2013; Ertürk 2020), hence the narrative of the hero entrepreneur as the key agent for technological change and economic development (Mariana Mazzucato 2011, 2014; Deirdre McCloskey and Alberto Mingardi 2020). The same idea is also present in the so-called "social entrepreneurship narrative" or the logic of applying technology to business models that can simultaneously address social problems while making profits (Serena Natile 2020). This narrative is evident in accounts documenting technological innovations, destined to address financial inclusion, which are limited to crediting the private sector as the sole driver of growth (for example, Ronald Mendoza 2007; US Chamber of Commerce Foundation 2015). Such views, however, disregard the efforts by local and national governments, supranational organizations, social activists, and non-government organizations in transforming financial systems across the world, enabling them to become more financially inclusive. This is important because the state "… play[s] many roles in building markets and institutions necessary for enterprise" (Philip Scranton and Patrick Fridenson 2013, 17).

In other words, under the accepted logic of innovation-fueled growth, the state assumes the cost of very risky investments in technology and private sector companies reap the benefits, but the state is unable to recoup this investment through taxation nor is the private sector willing to fund social spending in return (Mazzucato 2014). Taken together these views have important implications as to the future of the state as an engine of innovation and facilitator of markets and institutions for enterprise to thrive.

This study adds to the growing body of knowledge on the role of the state as an entrepreneur and creator of markets (Julian Lamberty and Jeppe Nevers 2022; Niall MacKenzie 2018; MacKenzie, Stephen Knox, and Mathew Hannon 2020; MacKenzie, Andrew Perchard, Chris Miller, and Neil Forbes 2021; and most prominently Mazzucato 2011 and 2014). Through the case of M-Pesa in Kenya, this study illustrates the vital role played by the state in facilitating the development of the technological innovations designed to foster financial inclusion as well as the role of the state as an entrepreneur in the creation of national champions and markets in emerging economies. The post-colonial financial sector in Kenya primarily aimed to serve multinational companies and European agricultural elites (Nicola Swainson 1976 and 1980; Robert Tignor 1998; Grietjie Verhoef 2017), while the success of M-Pesa delivered an inclusive financial sector. An inclusive financial sector facilitates access to retail financial markets through a broad range of products and services without price and non-price barriers to people with a broad range of needs (Asli Demirgüç-Kunt and Leora Klapper 2012a).

This study also frames the case of M-Pesa within an emergent global economic development agenda around financial inclusion to better understand the transformation of state intervention in Kenya that delivered an inclusive financial sector. The financial inclusion agenda is often dated to the introduction of structural adjustment programs in the 1990s by the World Bank and International Monetary Fund, the successful microcredit experiment of Grameen Bank by Muhammad Yunus in Bangladesh, or the Millennium Development Goals (for example, Ertürk, Indradeep Ghosh, and Kadambari Shah 2022; Natile 2020). However, early financial inclusion agenda activities can be traced to the initiatives launched by the US Federal government in the 1960s that reformed access to retail financial services by Black minorities. These formed part of President L.B. Johnson's (1963-1969) broader policy interventions to address poverty and ethnic discrimination (Carl Brauer 1982). Several countries adopted similar legislation to that described above in the USA during the 1980s. These regulatory innovations were part of a broader transformation of financial markets (for example, Edward Gardener and Philip Molyneux 1990), but mainly addressed the right of low-

income individuals to have access to a bank account. Financial inclusion gained prominence in the 1990s.[1] Around this time, financial inclusion also became associated with technological applications as a way of reducing poverty (Michael Chibba 2009). In 2003, United Nations Secretary-General Kofi Annan made financial inclusion the backbone of his speech to the General Assembly that year (Annan 2003), showing how the idea of financial inclusion had by then become a priority for international development economics. Annan's speech was followed by several private and public initiatives to increase financial inclusion around the world, including those taking place in Kenya and leading to the establishment of M-Pesa. As a result, this study also contributes to better understanding the effects of post-colonialism on modern-day economic business systems (Bernards 2022a; MacKenzie et al. 2021; Tignor 1998; Verhoef 2017). Empirical support emerges from a reinterpretation of public sources (such as newspaper articles, policy papers, reports by consultants and systematic studies by academics) and in particular, the narrative of innovation around the emergence of M-Pesa in Kenyan retail financial services. Taking this approach, we identify the type of sources where the neglect of the role of the state is more common and connect to the development of ideas of financial inclusion.

The article is organized as follows. The next section positions the research within a wider historiography that intersects technological innovation in financial services and the interaction of the state and business. This section also discusses the concept of state-led innovations. The two sections which follow explore the role of the state in the development and the adoption of technology for financial inclusion and outline state intervention and new markets in Kenya. The penultimate section explores financial inclusion activities in Africa and the world-recognized mobile banking service M-Pesa.[2] The final section summarizes the findings and offers suggestions for future research.

Innovation and Retail Financial Institutions: Historiography of Information Technology in Retail Financial Institutions

Figure 1 summarizes the contents of published sources used to trace, reassess and reinterpret the development of M-Pesa and financial inclusion in Kenya. The records utilized in this work were publicly available and easily accessible.[3] These include teaching case studies, policy documents, and contributions to peer-reviewed journals. These are all referenced throughout the text and are complemented with contemporary articles in electronic media, in international

[1] Google's N-Gram Viewer suggests the point of inflection came around 1997—see https://shorturl.at/mBK46 (accessed September 25, 2020). Note that by this point in time and following the enactment of the Americans with Disabilities Act in 1990, financial inclusion expanded to encompass physical aspects of the infrastructure (see Bátiz-Lazo 2018, 208). There is also a strand of research from a political economy perspective, such as that of Nick Bernards (2022a) and Paul Langley (2008), that presents an alternative view of financial inclusion (i.e. the access and routine use of ordinary financial services) not as unique to the twentieth century but as a continuation of a process of colonialism and the logic of neoliberalism.

[2] Throughout most of the twentieth century the term "mobile banking" described an alternative to retail bank branch distribution primarily through some sort of van or truck (Bátiz-Lazo 2018). However, the early understanding of what mobile banking could deliver changed with the advent of the commercial internet (Jennifer Mullan, Laura Bradley, and Sharon Loane 2017), with Google NGram situating this inflection point around 1997—see https://shorturl.at/imIJO (accessed September 28, 2020).

[3] Using the British Library, we identified eight UK dissertations dealing with a range of keywords around mobile money and M-Pesa or MPesa (as alternative spelling); using the same keywords we identified four newspaper articles in *The Banker*; nine in *Business Daily*; 12 in *Nation*; 16 in *The Economist*; 76 in the *Financial Times*; and 15 teaching cases at the *Case Hub*. We also identified six relevant speeches by Prof. Njuguna Ngdung'u, governor of the Central Bank of Kenya from 2007 to 2015 (dated 2008 to 2009). We were unsuccessful in our request for an interview with Prof. Ngdung'u.

and local newspapers (respectively *The Financial Times*, *The Banker* and *The Economist* in the UK and *Nation* and *Business Daily* in Kenya).

Source: see text and footnote 3.

Figure 1
Word Cloud of Innovation around M-Pesa, 2007-2020

As Figure 1 depicts, regulators and state institutions play a minimal role in the stories around M-Pesa (and the same analysis suggested they play no role when considering only teaching case studies and articles in international newspapers). Instead, innovations used to address financial inclusion in Western and African economies have been attributed to firms as diverse as infrastructure providers and mobile network operators (George Bongomin, Joseph Ntayi, John Munene, and Charles Akol Malinga 2018; Demirgüç-Kunt, Klapper, Dorothe Singer, Saniya Ansar, and Jake Hess 2018; Bill Maurer 2011), financial technology (fintech) start-ups (for example, Daniella Gabor and Sally Brooks 2017; Julapa Jagtiani and Catharine Lemieux 2017) and to a lesser extent, deposit-accepting financial institutions (Mullan et al. 2017; World Bank Group 2019a). These innovations, especially mobile banking, are described as disruptive.[4] That is, not only do they bring new business models and ways of operating to the retail banking sector but also allow consumers access to financial services, even in areas where access to bank branches, automated teller machines (ATMs), and other on-line banking facilities is poor (Lisa Schmidthuber, Daniela Maresch, and Michael Ginner 2020).

The narrative of innovation encompassed in contemporary studies on the role of technology in financial inclusion perpetuates the perception of the private sector as the sole

[4] The term "disruptive innovation" or "disruptive technology" was coined by Joseph Schumpeter (among others, Thomas McCraw 2007). In 1942, the concept of "creative destruction" was formalized as a process "that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one" (Schumpeter 1942, 83). Clayton Christensen (1993), and shortly after, Joseph Bower and Christensen (1995), further developed the concept while analyzing the failure of businesses to stay abreast when technology or markets changed. They argued that this process emanated from "disruptive technologies" (Bower and Christensen 1995, 45), claiming that customers have an important role in directing the activities of management, especially in the development of new technologies.

source of long-term economic growth (Rouse and Verhoef 2017; Rouse 2020 and references therein). At the same time, this narrative of innovation minimizes the state's role of providing the finance, the right environment and, in some instances, its active involvement in the development of technologies and their application for financial inclusion.

However, the narrative of innovation is not prevalent within the historiography of information technology in business organizations. For instance, in Kenneth Flamm's (1987; 1988) comprehensive studies of the origins and growth of the computer industry he attributed the growth of this industry to funding received from the state in Europe and the USA. Jon Agar's (2003) account of the British government's development and deployment of information processing machines from the late eighteenth century to the early 2000s proposed that the state played a central role in funding and the deployment of computers for use in government, military and civil services. This sentiment resonates also for France and the Soviet Union in James Cortada's work (2009). Indeed, the third volume of Cortada's "Digital Hand", provides a comprehensive study of how information technologies impacted the public sector in the USA (Cortada 2007). The other two volumes document how the US Federal government gave generous financial and technological support to selected firms in financial services (Cortada 2006) and defense-related industries (Cortada 2004).

The pervasive role that regulation and government policy played in the evolution of information technology has also been documented through individual business histories. For instance, some contributions detail the active role of the British government in the formation of ICL as a UK national computer "champion" (Martin Campbell-Kelly 1989) or techno-nationalism policies around Giro Bank and the Trustee Savings Banks (Bátiz-Lazo, Tobias Karlsson, and Björn Thodenius 2014; Mark Billings and Alan Booth 2011). There is also the role of the US Federal government as a large consumer of information processing infrastructure from the dawn of the computer industry in the case of Burroughs, NCR and Remington Rand (Cortada 1993) and throughout the twentieth century for IBM (Cortada 2019).

Absent from this body of published work, however, is a detailed story of how the confluence of government policy, regulation and technology enabled large numbers of individuals, usually of low income and at the base of the socio-economic pyramid, to take active part in retail financial markets through applications of information technology such as mobile banking.

This article extends the previous studies undertaken on computers and information technologies in banking from an historical perspective by explicitly examining the technological applications used to address financial inclusion. We document how the state played a pivotal role in promulgating a legislative framework that facilitated and encouraged the development of technological innovations for financial inclusion. These efforts of the state are explored by developing the contributions of Ann-Kristen Bergquist and Kristina Söderholm (2011), John Freeman and Raymond Duvall (1984), Stuart Leslie (2000), MacKenzie (2018) and the seminal contributions of Mazzucato (2011; 2014) on the entrepreneurial state. We show how state intervention in developing economies is not limited to capital-intensive projects and proven technologies but helps to build markets and facilitate innovation and entrepreneurship, ultimately leading to economic growth. We also document how this behavior can take place through the collaboration of state actors across nations.

MacKenzie et al. (2020) note that the concept of the state as an entrepreneur is based on the argument where the state seeks to orchestrate and operate resources to exploit an opportunity for commercial gain; then it can be considered as acting entrepreneurially. This idea builds on the seminal contributions of Frederich Riggs (1956) and Alexander Gerschenkron (1952) which originally used that characterization to describe the role of the state in underdeveloped countries and as a feature of Russian economic development. Later on, Freeman and Duvall (1984) suggested that the scope of the state's involvement in production extends beyond market regulation, defense and the provision of infrastructure, to

engaging directly in the production of capital and consumer goods. However, MacKenzie et al. (2020) also note how the concept of the entrepreneurial state has been used to describe varying levels of state control over strategically important businesses and industries as well as the role of state-sponsored capitalism in economic and industrial development.

A growing number of contributions have sought to expand on the otherwise dominant view that sees the state as restrictive of economic activity or the state's involvement in markets as "fixing a market failure" (William Lazonick and Mazzucato 2013). Lazonick (2007), for instance, points to the active role of the state in developing the capabilities of the future labor force through its investments in federal, corporate and university research laboratories, and through educational institutions. These investments augment the productive power of the economy through the creation of new knowledge while business enterprises have made ample use of this knowledge and capability. In the case of the US, state agencies (as opposed to state-owned enterprises) stemming from the New Deal created projects and stimulated innovation through political and financial prioritizing (Scranton 2006).

The role of the state in the genesis and financing of innovations has also been documented. In his seminal work, Leslie (2000) documented the military's role (intentional or otherwise) in creating and sustaining Silicon Valley and how this contribution had been largely overlooked in most accounts of the Valley's success. Silicon Valley has since become recognized worldwide as a powerhouse of innovation and business creation (Jerome Engel 2014). For their part, Fred Block and Matthew Keller (2009) contend that 77 (88 percent) of the 88 most important innovations (as rated by *R&D Magazine*'s annual awards) in the US between 1971 and 2006 had been fully dependent on the support of the Federal government. This was especially the case during the early years of that period. The remaining 11 (12 percent) of the top innovations were not subject to federal funding but relied entirely on investments by the private sector.

The contributions of Mazzucato (2011; 2014) stand out in placing the state (broadly defined) as a key actor in the process of innovation. Mazzucato (2011, 76) in particular has sought to debunk the myth of the hands-off state in innovation development by identifying various sectors and technologies where the state has played a key role in their development including jet planes, lasers, biotechnology, and most relevantly for this article, mobile telephony. Mazzucato (2011) asserted that the state plays an active role in the development of innovation, contrary to a Keynesian emphasis on taxation, subsidies, spending and regulation or Schumpeter's emphasis on creating the "right conditions" for innovation and growth. Mazzucato (2014) documents several case studies shedding light on how public sector institutions initially funded all of the technologies that made Apple's i-products (iPhone, iPad, etc.) "smart", namely, the Internet developed by the Defense Advanced Research Projects Agency (DARPA), the global positioning system (GPS) by the US Navy, the touchscreen display by the Central Intelligence Agency (CIA) and the voice-activated personal assistant, Siri, also by DARPA. In short, Mazzucato (2014) does not preclude the role of risk-taking, ingenuity and contribution to economic growth by private individuals in making innovations work (or fail), but highlights that the state has assumed the role of an entrepreneur in many key innovations of the late twentieth and early twenty-first centuries and this role is seldom appropriately rewarded—and increasingly, not rewarded at all.

This approach, therefore, rejects a view of state activity as negligent, interventionist or non-existent. It argues that throughout the twentieth century governments played an active role in in creating industries and technologies (MacKenzie 2018; Mazzucato 2014). This contrasts with the widely-held view that as countries develop and globalize, the state no longer plays an active role and industrial policy wanes (Lamberty and Nevers 2022). However, empirical evidence is overwhelmingly sourced in developed countries of the geographical north where state action is often described as being interventionist because the markets already exist. In the global south, when the state is active in setting up, encouraging, or

engaging directly in economic activity it is characterized as being entrepreneurial (i.e. creating markets).

The Role of the State in the Development and Adoption of Technology for Financial Inclusion

In the late 1970s and early 1980s there was a global movement to widen access to credit as part of the broader activities to provide financial services to the poor which become known as the microfinance movement (Center For Global Development 2020). In Bangladesh the most well-known microcredit interventions occurred in the late 1970s and later in 1983 with the establishment of the Grameen Bank (community bank) by Muhammad Yunus (Chibba 2009).[5]

As the 1990s progressed, finance ministries and central banks around the world began to promote financial inclusion actively, primarily seeking to improve access to retail financial services for those who would otherwise be excluded (André Mialou, Alexandra Massara, and Goran Amidžić 2017). This change in sentiment was made evident as, for instance, the term "microfinance" gradually replaced "microcredit" to refer to a broader range of financial products (beyond credit for microenterprises and including savings, insurance and others), but also as these were increasingly promoted as a more effective and sustainable way of achieving development than state-subsidized credit (Bernards 2022a, 2022b; Susan Johnson and Steven Arnold 2012; Natile 2020).[6]

The promotion of financial inclusion took hold with the establishment of the Millennium Development Goals in 2000, where the need for financial inclusion was reiterated and the importance of coordinated actions to achieve this goal in governments, civil society and the private sector across the globe was emphasized (United Nations 2014). As a result, at the 2010 G20 meeting in Seoul, the leaders of the G20 countries formally recognized that financial inclusion was a key pillar of long-term global economic development (Global Partnership for Financial Inclusion 2019).

As the drive for financial inclusion gained momentum, so too did the links between this policy effort and the use of technology to achieve it. The emergence of a global financial inclusion agenda for poverty reduction supported the idea of technological and service innovation to reach the financially excluded via alternative delivery routes, including branchless banking, mobile banking and payments delivered through post offices, retail outlets, grocery stores, or gas stations among others (Rouse 2020). For instance, as early as 1999, the importance of technology was evidenced in the establishment of the Social Exclusion Unit by the UK government (Lavinia Mitton 2008; Social Exclusion Unit 2001). Reports emanating from these efforts not only estimated the number of people without access to financial services but also identified core retail banking features dependent on existing technology (New Policy Institute 2007). These included wage, salary and benefit payments deposited directly into a bank account through an automated credit transfer,[7] considered cash withdrawals at convenient access points (including access to ATMs by the physically disabled) and bill payment by direct debit or credit transfer (Carbó Valverde, Gardener, and Molyneux 2007; HM Treasury 1999).

[5] The Grameen Bank prioritized the granting of microcredit to women and Yunus was later awarded the Nobel Peace Prize in 2006 in recognition of the founding of the Grameen Bank and for pioneering the concepts of microfinance and microcredit (Don Johnston and Jonathon Morduch 2008).

[6] The Oxford English Dictionary dates the first use of "micro credit" in 1988. "Micro finance" as related to the financial problems of the individual economic unit appears in 1963 and as the provision of loans and other financial services to low-income individuals. We refer to the second definition. The Google N-Gram viewer dates both "microfinance" and "microcredit" to the early 1990s. See https://shorturl.at/notxY (accessed February 1, 2023).

[7] On the origins of direct to account wage and salary payments see Bátiz-Lazo et al. (2014) and Malte Krueger (2017).

Other notable early initiatives included that of the Australian government, which in 1997 piloted the use of electronic benefit transfers to process social welfare payments directly into bank accounts. One of the outcomes of this project was improved access to financial services and a significant number of new bank accounts were opened amongst low-income individuals and minorities (Elaine Kempson, Adele Atkinson, and Odile Pilley *2*004). In 1997 the US Treasury introduced a policy which would require all government payments to be made by electronic funds transfer (EFT), mainly as cost-saving measure to reduce the fees associated with issuing checks (Michael Barr 2004; US Department of Treasury 1997). One of the outcomes of this policy was the broadening of access to financial services amongst low-income individuals and minorities who had opened bank accounts in order to receive the EFT payments (Kempson et al. *2*004).

Similar to the US and Australia, in 2003 the UK issued a policy which required the payment of social security benefits and state pensions directly into bank accounts through EFTs (Kempson et al. *2*004). Many other countries thereafter also introduced EFTs for government payments. These efforts were based on the notion that government-to-person (G2P) payments could drive transaction volume (both up or down), decrease transactions costs and draw more low-income individuals into the financial system (Mark Pickens, David Porteous, and Sarah Rotman 2009).

Many non-banks were effectively leveraging wireless technology to meet the financial needs of unbanked or underbanked consumers (David Bomser 2010). State actors and non-banks (particularly telecommunication providers) could articulate digitally-enabled funds transfers to play a complementary role in the provision of easily accessible and affordable retail financial services (Halsey Minor 2015). The World Bank identified stark disparities in the use of financial services between high-income and developing economies through the Global Findex Survey whilst recognizing the power of mobile technology to enhance access to financial services, especially in Sub-Saharan Africa (Demirgüç-Kunt and Klapper 2012b). The World Economic Forum acknowledged the use of mobile technology in delivering financial services to the unbanked poor (World Economic Forum 2011) and the United Nations emphasized the use of innovations in digital and mobile banking as a means of expanding financial inclusion. Consequently, in 2012, the United Nations established the “Better than Cash Alliance” to advocate the digitization of cash payments, in partnership with various donors, to alleviate poverty and drive inclusive growth (Better than Cash Alliance 2019). In 2014, the United Nations Capital Development Fund launched the “Mobile Money for the Poor” program in partnership with the Australian government’s agency for foreign aid, “AusAid”. The program encouraged poorer countries to use mobile banking for the retail delivery of services (UN Capital Development Fund 2019).

As this financial inclusion agenda evolved, the state played a pivotal role across the globe, particularly in using technology to boost the number of bank accounts since the late 1990s. This served to increase financial inclusion amongst low-income populations and ethnic minorities. As the next section illustrates, this was also the case in Africa, and specifically in the development of a mobile payments service called M-Pesa.

State Intervention and New Markets in Kenya

A business elite emerged during the twentieth century in Kenya alongside investments in infrastructure development and a combination of policies aimed to reduce substantial US dollar deficits while enhancing the competitive position of the colony (Swainson 1976). Initially, this business elite aligned to British colonial power and interests, while later it evolved within kin and ethnic lines. Asian (Indian) immigrants, for instance, first established themselves as long-distance traders, and they later became a key element in the development of the Kenyan manufacturing sector (David Himbara 1994; Gijsbert Oonk 2015). Hence, an indigenous

business elite was evident by the 1920s, established around wealthy European stockowners and farmers, Asian traders and a handful of African entrepreneurs (Verhoef 2017).

In the late 1940s and during the 1950s, colonial officials and notably Finance Minister Ernest A. Vasey (1901-1984) sought to transform the Kenyan economy. According to the detailed study by Tignor (1998), they sought to develop employment opportunities outside agriculture, looking to promote European investments and favoring white settlers while distrusting Asian and African entrepreneurs (believing they were incapable of identifying profitable and useful investment opportunities). However, these efforts, says Tignor (1998), were derailed by a combination of the Mau Mau revolt and efforts to protect export markets by those same large British firms they were trying to attract. Tignor (1998) opines that Vasey favored projects that offered immediate returns over expenditure on social projects, accentuating an already wide social inequality gap. According to Tignor (1998), the Mau Mau revolt had little negative impact on business but brought about far-reaching political change, including accelerating the transfer of power and authority to black Africans, encouraging free markets, capital accumulation and the emergence of a propertied middle class amongst the black African population.

Under the post-independence leadership of Jomo Kenyatta (Prime Minister, 1963-1964, and President, 1964-1978) policies to promote large-scale private capital investments continued and the state was a significant investor in agriculture and industry and also encouraged both local and international investment (Swainson 1980). State policies supportive of private enterprise together with state support for small and medium size enterprises were instrumental in rapid growth in the private sector in Kenya (Verhoef 2017).

In 1963, just before independence, the government established the Development Finance Company of Kenya (DFCK), a limited liability enterprise, to stimulate the flow of local or foreign investment (Miatta Fahnbulleh 2006). The DFCK provided share capital (non-controlling interest) and loan finance for large industrial developments. To ensure that foreign investments met the government's goals and priorities set out in the development plan, there followed a screening process and approval was granted under the 1964 Foreign Investment Promotion Act (Swadesh Kalsi 1972). This Act established a system of incentives for foreign capital and the state provided capital to the private sector mainly through the Industrial and Commercial Development Corporation, to provide direct investments or loans to African industrialists for smaller-sized projects (Fahnbulleh 2006). This approach was in stark contrast to other newly-independent African countries such as Tanzania, Zaire and Zambia that favored state-owned enterprises and opposed foreign-owned businesses (Verhoef 2017). After independence the state also embarked on a series of measures to increase local Kenyan business. Initiatives built upon the "protection of infant industry" argument and the creation of "national champions". These measures included trade licensing, state monopolies, state financing, state capitalistic enterprise and the direction of private capital (Colin Leys 1978).

In spite of a colonial legacy of commercial and savings banks in the country, a number of indicators point to an underdeveloped retail financial market infrastructure in Kenya by the early 2000s. For instance, a national household survey conducted in 2006 estimated that only 18.9 percent of the Kenyan population had access to formal financial services (FinAccess National Survey 2006). The same source noted that most of the population excluded from formal financial services resided in rural areas. Meanwhile Thorsten Beck, Demirgüç-Kunt, and Maria Martinez Peria (2007) measured the financial sector outreach in countries with less than one bank branch per 1000 km^2 in 2004. According to this survey, Kenya, with 0.77 branches per 1000 km^2, ranked 83rd out of 98 nations their survey. At the time of the launch of M-Pesa, Kenya had only 450 bank branches, 600 ATMs and 350 Western Union agents across the country with an estimated population of 36 million (Pauline Vaughan 2007). This equated to 3.55 bank branches for every 100,000 adults compared to the world average of 10.74 branches per 100,000 adults in 2007 (World Bank Group 2019b).

In October 2007, the *Financial Times* first alerted readers to an innovation that had been launched earlier that year in Kenya, which aimed to service "unbanked poor" by combining retail financial services and mobile phones. This article made no mention of state actors as it only credited telecom company Safaricom and its network of 625 local agents in developing the service known as M-Pesa.[8] The article concluded that the "company's biggest challenge [was] to keep up with soaring demand by finding new agents and ensuring they had enough cash to turn text messages back into shillings" (*Financial Times* 2007a). Note how a newspaper article in a world-leading media outlet documented and reported the new service within six months of the birth of a project using apparently novel technology to address financial inclusion. This reflects the great interest in delivering viable mobile payment solutions at the time (Yoris Au and Robert Kaufmann 2008). However, the newspaper article did not mention the role of the state in procuring that innovation.

Against the backdrop of these developments in Kenya, the remaining sections of this article explore the technological innovations used to address financial inclusion in Africa and specifically in Kenya. The next section sheds further light as to how this global agenda framed the establishment of M-Pesa and the role of the Kenyan and British states in that process.

Financial Inclusion in Africa and M-Pesa

In this section we analyze the activities undertaken to address financial inclusion and particularly the use of technologies to enhance access to financial services. As was the case in the US, Australia and Europe, countries in Africa also took steps to promote financial inclusion. A lack of formal financial services in many areas in Africa was due to limited communication infrastructure, poor quality transport facilities and low population densities (Simplice Asongu and Jacinta Nwachukwu 2017).

Notable steps to increase financial inclusion in Africa include those in South Africa. It adopted a Financial Services Charter in 2004, with clear financial inclusion objectives and an agreement with the Banking Council, that resulted in the launch of a low cost "no-frills" bank account called the "Mzansi" account (Mandira Sarma and Jesim Pais 2011). This action was taken by individual banks on a voluntary basis in an attempt to redress the high proportion of the population who were excluded from the financial system.

Nigeria addressed financial exclusion through an attempt at a "Cashless Policy" in June 2012 (Charity Ezuwore-Obodoekwe, Afamefuna Eyisi, Steve Emengini, and Alio Felix Chukwubuzo 2014). It was hoped that this policy would curb the demand for banknotes and coins whilst encouraging the use of electronic banking (ibid.). Apparently, high levels of internet fraud and financial illiteracy initially hampered implementation (Pius Okoye and Raymond Ezejiofor 2013). Despite the implementation of this policy, currency in circulation more than doubled between 2015 and 2022, rising from N1.46 trillion in December 2015 to N3.23 trillion in September 2022 (Ayodeji Adegboyega 2022). These figures suggest that Nigeria remains a largely cash-based economy where up to 60 percent of trade takes place through the informal economy (Worldeconomics.com).

Another notable example of financial inclusion in Africa is that, starting in the mid-2000s, various countries throughout Africa began to use mobile technology as a means of reaching the unbanked. Mobile phone operators increasingly recognized the potential for this technology to offer affordable basic banking services securely using the existing telecommunications infrastructure (Ross Tieman 2008).

In November 2004, the first mobile banking product called "Wizzit" was launched in South Africa to provide mobile banking services aimed at the low-income, previously

[8] As a legacy of the colonial past, the single state-owned telecommunications company had a monopoly over landline operations, resulting in very high tariffs (Muriuki Mureithi 2017). However, in 2007 the government liberalized the telecommunication sector.

unbanked, population (Vivienne Lawack 2012). Wizzit was a joint venture between a domestic mobile network operator (MTN Group, formerly M-Cell) and a local financial institution (Standard Bank) to provide banking services using existing mobile phone technology (using Unstructured Supplementary Service Data or USSD). Users were able to access banking services without the need for an internet connection and these services were available across all mobile telecommunication networks. In the following year, MTN Group launched "MTN Banking" in partnership with Standard Bank. Soon after, the other major banks in South Africa launched mobile banking in partnerships with mobile telecommunications operators (Lawack 2012).

Amongst the efforts at financial inclusion in Africa, Kenya has shown remarkable success with mobile banking, chiefly due to its mobile money service M-Pesa (with the "M" denoting mobile and "Pesa" denoting money in Swahili). The idea behind M-Pesa began with UK mobile operator Vodafone looking at ways to address issues such as the aim of the Millennium Development Goals to halve poverty by 2015. Nick Hughes, the Vodafone executive who initiated the M-Pesa project, met with the representative from the UK's Department for International Development (DFID) at the World Summit for Sustainable Development in 2003 and was encouraged to submit a proposal that would fill a niche in the market by serving those with no access to formal financial services and in this way also contribute to the Millennium Development Goals via financial inclusion (Hughes and Susie Lonie 2007).

The DFID, the governmental department responsible for administering international aid, had initiated a number of projects to support the development of financial markets in Africa (Natile 2020). Among these, the "Sector Development Trusts" project was designed to work directly with private sector institutions, donors, and local governments to address constraints to financial inclusion. The DFID had also investigated the potential relationship between new technologies and poverty reduction in Africa (Kevin McKemey, Nigel Scott, David Souter, Thomas Afullo, Richard Kibombo, and Owuraku Sakyi-Dawson 2003). These studies documented the practice of transferring prepaid airtime and using it as a virtual currency (Natile 2020).[9]

Hughes obtained funding through a public-private partnership from the recently-established Financial Deepening Challenge Fund (FDCF) (Hughes and Lonie 2007).[10] Through the FDCF, the DFID made £15 million available for joint investments with the private sector for projects to improve access to financial services (Nathan Associates 2018). The mandate for the FDCF fund managers and proposal assessment team was to seek schemes involving the development of a new product or service; a new service that could provide customers with access to goods or services that were currently unavailable to them; or the application of a technology that would reduce the cost of service provision (Hughes and Lonie 2007). One of the FDCF target zones was East Africa, and both DFID and Vodafone had a significant presence in Kenya (Natile 2020).

[9] Monetizing airtime consists of users buying a prepaid scratch card and texting the code to another user, who can then choose to sell the code to another person or to a merchant in exchange for cash or other commodity or service (Maurer 2012 and 2015).

[10] A challenge fund can be described as an investment vehicle that provides grants or subsidies with an explicit public purpose between independent agencies, with grant recipients selected on a competitive basis through advertized rules and processes (Anne-Marie O'Riordan, James Copestake, Juliet Seibold, and David Smith 2013). Challenge funding requires competition winners to commit to delivering measurable outputs, and the progress of a project is monitored against an action plan and includes sanctions for poor performance (Paul Foley 1999). Grant recipients retain significant discretion over the formulation and execution of their proposals and share risks with the grant provider (O'Riordan et al. 2013). The UK's DFID has been hailed as the pioneer of challenge funds (Foley 1999; KPMG 2012) while the World Bank has recognized the role that challenge funds play in developing transformational banking technologies (Amal Ali and Emma Phillips 2017).

The providers considered state support because experience suggested that it was often difficult to scale up a social enterprise innovation, particularly in a place like Kenya where there was a widely dispersed population in rural areas of an emerging economy (Michael Berret 2011). It was thus considered that the "initial stages of technological development were *highly uncertain*, and required a flexible and innovative approach" (Berret 2011, 4, emphasis added).[11] Note we highlight the degree of uncertainty to emphasize how, contrary to the narrative of innovation, private agents are fundamentally risk-averse and it is state agents who finance projects with highly uncertain outcomes (see further Mazzucato 2011 and 2014).

The M-Pesa project received funding of approximately £1 million in 2004 and this amount was matched by Vodafone through a combination of cash and staff time (Tamara Cook 2015). The initial focus was set on using mobile phones to deliver micro-loans and repayments (Berret 2011; Stephanie Ludwig and Tawfik Jelassi 2011). The vision of the M-Pesa team, under the leadership of Nick Hughes based in the UK and Susie Lonie in Kenya, was that the convenience of transferring small amounts of money electronically could have social and economic benefits in countries where the vast majority of people lacked access to traditional banks (Nic Fildes 2010). Vodafone first considered purchasing an off-the-shelf financial services platform, but did not find one that suited their needs. As the result of a competitive process, they appointed Sagentia, a Cambridge-based British software developer specializing in "blue sky" strategic development, as the technical partner to develop the service (Hughes and Lonie 2007).

In 2005, Sagentia finished product development after obtaining detailed specifications and identifying the needs of customers. The M-Pesa pilot project was then launched in October 2005 (Stella Wooder and Steven Baker 2012). The initial partnership involved Vodafone, a local network provider called Safaricom, a microfinance institution called Faulu Kenya and the Commercial Bank of Kenya (Hughes and Lonie 2007).[12] The bank played "an important role by engaging regulators and providing necessary commercial banking services, for instance a bank account for the project" (Berret 2011, 6). Faulu Kenya provided the user groups (made up of 500 microfinance clients and eight agent stores) to test the technology developed to facilitate the repayments of micro-finance loans. At that time, Vodafone owned 40 percent of Safaricom, which was run from 2000 until 2010 by CEO Michael Joseph. Safaricom had a strong brand presence and was the biggest provider with 75 percent share of the Kenyan mobile phone market (Ludwig and Jelassi 2011; Ignatio Mas and Olga Morawczynski 2009; David Owiro and Jonathan Tanui 2011).[13]

An interesting development that would change the course of the project took place early on. The initial service offering during the pilot phase included in its features the ability to send and receive money and to buy airtime for the user or for other registered users on the same network via short-message service or SMS (Wooder and Baker 2012). The users of the pilot began to use the service not only to repay the formal loans but also sent money to people within the pilot group, thus illustrating the benefits of mobile money transfer not only in the repayment of microfinance but in the wider population. The actions of the pilot group gave the

[11] Note that Berret (2011) is based on the testimony of Steve Prince, who at the time was the Service Information Manager at Sagentia, and the lead collaborator with Vodafone in Kenya, Tanzania and Afghanistan.

[12] Berret (2011, 6) claims the partnership was established with the Kenyan subsidiary of the Commercial Bank of Africa, with headquarters in Tanzania.

[13] Morawczynski (2010, 74) further claims that in March of 2009, Safaricom "held 79 percent of the market share, followed by Zain who had just 13 percent". However, official figures show that by 2019, Safaricom's share of the 54,555,497 total mobile phone subscribers in Kenya was 64.7 percent. Its closest competitor was Airtel Networks with 25.8 percent, followed by two others with a combined share of less than 10 percent (Communications Authority of Kenya 2020, 11). Before Joseph arrived in 2000 Safaricom was reported to have "about 20,000 customers" (*Financial Times* 2007b).

team at Vodafone the idea to include the previous South African experience of monetizing airtime. Mobile phone technology could then be used to transfer value from one person to the next or even to pay bills. The pilot group also showed the partners that people were ready to use mobile money technology for on-the-spot transactions and other retail payment services (Gamechangers from *The Economist* 2021). Escalating this unexpected behavior opened the opportunity for Safaricom to retain its existing mobile network customers in a competitive market by providing a mobile money service (Katrina Manson 2014), while monetizing the airtime balances meant that through its Kenyan subsidiary Vodafone *de facto* entered into the provision of retail financial services.

The M-Pesa project team engaged with the Central Bank of Kenya (CBK), the monetary authority in that country, in the early stages of the project before launching the service. After detailed discussions, further developments of the service offerings were made (Alliance for Financial Inclusion 2010). Joseph approached Bitange Ndemo, the permanent secretary of the Ministry of Information and Communications (2003-2013) to garner support for the approval process with the CBK. At the time, there was no policy nor legal framework in place to address this new mobile banking technology (Ndemo 2017).

The CBK directed the Ministry of Information and Communications to act in an oversight role for M-Pesa and the Ministry began taking steps to draft an electronics bill and policy to address mobile money (Ndemo 2017). The CBK obtained a legal opinion that said the M-Pesa service did not meet the definition of a banking business and therefore did not need to comply with the requirements of the 1989 Banking Act , as it was simply regarded as a service that facilitates the transfer of money.[14] Thus, the CBK exempted the retailer as agent in a correspondent banking network from the strict regulation that governed banks and other financial institutions and allowed M-Pesa to contract with thousands of retail agents to offer their services (Scott Burns 2018). The CBK then issued a letter confirming that it did not have an objection to the service as proposed. In March 2007, the M-Pesa service was officially launched across Kenya (Morawczynski 2009). The service was an immediate success and soon started to grow in scale and scope. In 2008, for instance, M-Pesa services expanded to the Kenyan Post Office Savings Bank branches and included bill payments, bulk salary payments, and cardless transactions at ATMs (Brian Muthiora 2015). The CBK also authorized M-Pesa to provide foreign exchange business in 2008 (Peter Ondiege 2015).

The enabling regulatory environment facilitated by the CBK has been credited as key to the success of the large scale investments in new mobile technologies such as M-Pesa (Troy Beck, Lemma Senbet, and Witness Simbanegavi 2015; Burns 2018; Indlanna Minto-Coy and Maurice McNaughton 2016; Ondiege 2015; Porteous 2009).[15] The CBK took an open and flexible supervisory and regulatory approach to mobile banking. This is in contrast with the traditional regulatory approach towards innovation beginning with legislation, then regulation and lastly innovation, which could take years (Beck et al. 2015). The CBK had to address concerns about whether M-Pesa had the necessary controls in place to operate a payment system of this scale whilst ensuring sufficient consumer protection and to address money laundering concerns, in the absence of specific regulation of mobile money (Alliance for

[14] There was no leverage or treasury operations with the funds circulating in the M-Pesa network. Cash provided by M-Pesa's customers in exchange for electronic funds was kept in a trust bank account and was not "on-lent" by Safaricom in the pursuit of other business nor generated interest income. The cash also remained in the customer's control (Alliance for Financial Inclusion 2010).

[15] An enabling regulatory approach allows a non-bank to engage in money transfer activities, imposes capital requirements that are proportional to the risks of the e-money businesses, permits agents to cash-in and cash-out electronic money and does not prescribe the implementation of interoperability (i.e. it allows a market-led approach) (GSMA 2014). An enabling environment is an important component of successful mobile banking adoption and for the fast growth in mobile banking services (GSMA 2017).

Financial Inclusion 2010). Reflecting on the policy making process Ndemo stated that "[c]learly, M-PESA is a classic case in which innovation preceded policy. In such cases, policymakers take the risk and, through system wide consultations, push for supportive policies" (Ndemo 2017, 356).

The regulatory approach taken by the CBK was met with opposition. According to former Safaricom CEO Joseph, banks in Kenya tried to thwart M-Pesa and formed a group to oppose the project (Penny Crosman 2011). The banking industry raised concerns to the Kenyan Minister of Finance that M-Pesa would not be able to develop the risk management skills and procedures to manage such a large payment system. Similarly, the Kenyan Bankers Association accused the CBK of allowing a non-bank to provide financial services without needing to comply with the capital and liquidity requirements of traditional banks (Burns 2018). The CBK ordered a due diligence audit to address the concerns raised by the banking industry which took place towards the end of 2008 (John Njiraini and James Anyanzwa 2008). The results of the audit confirmed that the M-Pesa payment service was secure and reliable, and reiterated that mobile money service providers were not banking service providers (Minto-Coy and McNaughton 2016).[16]

The CBK did, however, place a limit on the value of transactions (to address money laundering concerns), requiring agents to pre-deposit cash in a bank account in commercial banks (e-float), from which an electronic value was used to guarantee all consumers' deposits and withdrawals (Alliance for Financial Inclusion 2010). The regulations regarding know-your-customer (KYC) and anti-money laundering (AML) were much less stringent than those applying to established financial institutions and were proportionate to the size of the transactions. This facilitated access to financial services, particularly for rural communities which lacked formal documentation and rural banks that often did not have a cost-effective way to ascertain customers' identities to comply with KYC and AML regulation (Burns 2018).

As noted, M-Pesa's distribution strategy relied on existing Safaricom outlets and small retail stores around the country to convert e-money into currency and vice versa (William Jack and Tavneet Suri 2014). As the financial service offering of M-Pesa grew, these retailers acted as de facto bank branches (Jennifer Tescher 2009). Such strategy initially placed banks at a competitive disadvantage. However, the Finance Act was modified in 2009 to allow for agent banking, which enabled banks to offer mobile banking across Kenya through their agents. In 2010, the CBK altered the regulations again to allow commercial bank agents and their retail outlets to initiate new accounts and increased the number of deposits and withdrawals that could take place (Burns 2018). Commercial banks were thus able to engage in agent banking while customers could access banking services without having to travel large distances to urban bank branches. As a result and after initially opposing the M-Pesa services, banks eventually embraced mobile money as a tool to provide financial services to the unbanked (John Adams 2011).

Another important regulatory development was the enactment of the National Payment Systems Act in 2011. This provided a flexible framework for agency banking and gave the CBK oversight over mobile payment services (National Council for Law Reporting 2011). The

[16] The results of the audit took place under the terms of the Banking Act of 2009 (Central Bank of Kenya 2009). This legislation consolidated and amended previous laws related to banking and defined a banking business along the same provisions of the Banking Act of 1989 as follows: "(a) the accepting from members of the public of money on deposit repayable on demand or at the expiry of a fixed period or after notice; (b) the accepting from members of the public of money on current account and payment on and acceptance of cheques; and (c) the employing of money held or on current account, or any part of the money, by lending, investment or in any other manner for the account and at the risk of the person so employing the money". The legal definition of "banking service" did not apply primarily because of the third element, that is, the lack of an interest-generating lending of deposits facility within M-Pesa's business model.

CBK adopted a functional approach to the oversight of mobile banking with both banks and non-banks, including mobile network operators, permitting them to provide mobile money services (Muthiora 2015). The various regulatory changes undertaken by the CBK created a levelled competitive environment for agency banking and for mobile network operators across the country.[17]

Regulatory changes allowed M-Pesa to expand and include other networks and non-registered users (Ondiege 2015). Joseph praised the success of the project in facilitating the safe transfer and storage of cash on mobile phones as opposed to notes and coins (James Crabtree 2012). He further identified having a dense distribution network of retail points (situated around the country in mobile phone retail outlets, airtime distribution stores, grocery stores, petrol stations, tailors, and other businesses) to cash airtime as key in meeting customers' needs cost-effectively and at scale (Jack and Suri 2014).

As the volume and diversity of transactions through M-Pesa grew, the service became more reliant on other providers including those in the banking system. Here Joseph pointed to having these partnerships among those who could distribute the services as key to success (Tescher 2011). These partnerships included, for instance, offering international payments between family members using M-Pesa by entering into an agreement with Western Union to allow family remittances from the UK to Kenya in 2008 (Steve Bills 2008). In 2009, farmers could purchase insurance against crop failure, rural communities could purchase safe water and could make microfinance repayments (Muthiora 2015). The M-Pesa facility became linked to formal bank accounts in 2010 through a partnership with the Equity Bank (Johnson and Arnold 2012). This product, known as M-Kesho ("kesho" meaning tomorrow in Swahili), is a facility using the M-Pesa platform and agent network to offer more banking services to customers, such as interest-bearing accounts, loans and insurance (Jake Kendall, Bill Maurer, Philip Machoka, and Clara Veniard 2011). In 2012, M-Pesa launched another new product, M-Shwari ("shwari" meaning calm in Swahili), a savings and loan facility (Ondiege 2015). In addition, by using M-Pesa, customers created data which could be used to underwrite small loans for consumers who did not have sufficient credit history (Crosman 2015).

The absence of alternatives for domestic money transfers was another key factor that fueled the growth of M-Pesa subscribers (Mas and Morawczynski 2009). It was estimated that M-Pesa had 20 million subscribers by 2015 (Sibusiso Tshabalala 2015). This equated to 42 percent of Kenya's estimated population of 47.8 million (World Bank Group 2019a). In 2019 M-Pesa was the largest of the five mobile money operators in Kenya with 65 percent of total mobile subscriptions (35,335,107), 85 percent of mobile money transfer agents (173,259), 98 percent of registered mobile money subscriptions (28,842,584), and 99 percent of total value of mobile money deposits (606,560 million Kenyan Schillings) (Communications Authority of Kenya 2020, 20). By this point in time, M-Pesa was already described in several outlets and publications as a world leader in mobile money services (Burns 2015).

M-Pesa has provided access to a networked economy for all parts of the Kenyan population, from herdsmen, subsistence farmers, slum dwellers to urban dwellers (David Pilling 2016). According to the Global Financial Inclusion (Findex) database, for instance, the proportion of adults (aged 15 years or over) who have access to a bank account in Kenya has grown from an estimated 42 percent in 2011, to 75 percent in 2014 and to 82 percent in 2017 (Demirgüç-Kunt and Klapper 2012b; Demirgüç-Kunt, Klapper, Dorethe Singer, and Peter Van Oudheusden 2015; Demirgüç-Kunt et al. 2018). In terms of adults with bank accounts, Mauritius is the leading country in Africa with 90 percent, followed by Kenya with 82 percent

[17] Regulatory and policy changes were also made in Tanzania between 2011 and 2012 following the Kenyan approach. These included deregulating mobile financial services and relaxing the regulations of mobile network operators (MNOs). These changes have been credited with the high uptake of mobile banking in Tanzania (Burns 2018).

as per the 2017 Global Findex Survey (Demirgüç-Kunt et al. *2*018). In Kenya, this is mainly due to the successful use of mobile banking creating skills and credit worthiness amongst previously unbanked individuals. Sub-Saharan Africa, in particular Kenya, has been recognized for pioneering the use of mobile and technological innovations to address financial inclusion (Rouse and Verhoef 2017).

Conclusion

This article has analysed the role of the state in the development of technology used to address financial inclusion, and specifically, the use of mobile banking. We trace the development of financial inclusion to policies by the US Federal government in the 1960s. This agenda eventually embraced technological solutions, in particular, mobile banking solutions developed to address financial inclusion. These emerged in the 1990s and were part of a collaborative effort of various players, including governments, non-governmental organizations and public-private partnerships.

Evidence documented in this article tells how collaboration between domestic and international private providers, together with the Kenyan state, was able to utilize resources and direct technological change to create new markets. We also examined the role of the Central Bank of Kenya and the country's Ministry of Information and Communications in creating a conducive regulatory environment for the ICT industry, which enabled the diversification of telecommunication providers into the retail financial services industry.

The M-Pesa project illustrated how the UK state challenged interested participants to propose innovative solutions, provided finance to develop the technology and, together with the Kenyan government, innovated the payment systems infrastructure for financial services to be delivered via mobile phone technology. The findings of this article contradict the view that the private sector alone has been spearheading technological innovations to address financial inclusion. Furthermore, our findings sit in sharp contrast to what we termed "the narrative of innovation and technology" over mobile money, where there is an absence of any state actors in the development and widespread adoption of this technology. The state not only assumed the function as facilitators of change, but also a risk-taking function. This article sheds light on the role of the state in partnership with the private sector in shaping and directing technological change in financial services, especially in the delivery of a broad range of financial services to the previously unbanked. This has been the case with M-Pesa in Kenya.

Other Sub-Saharan African countries such as Botswana, Ghana, Nigeria and South Africa launched similar initiatives but were not successful in the widespread adoption of mobile banking during the period 2007 to 2015.[18] Beyond Africa during this period other large developing economies such as Brazil and India did not allow non-banks to establish mobile financial services (electronic money).

It is often argued that the failure for mobile money to develop in the four African countries listed above can be traced to the failure of their governments to adopt enabling regulatory environments as had been the case in Kenya (for example, Burns 2018). These countries adopted a bank-led approach to mobile financial services and required mobile banking service providers to comply with strict banking legislation. It was also the case that some of these countries, and notably Nigeria and South Africa, already had more robust and widespread banking infrastructure as well as deeper retail financial markets than Kenya (Rouse 2020). However, and as noted by a reviewer, the four countries listed above were all former British colonies, with a broadly similar legal framework at the time of independence in the 1960s. This would somewhat weaken the argument around the impact and importance of post-colonial

[18] Other mobile money schemes launched in the mind-2000s failing to ignite and achieve explosive growth included those in Burkina Faso, Haiti, India, Indonesia, Madagascar and Mexico (David Evans and Alexis Pirchio 2014).

regulation and strengthen the importance of decisions by individual politicians and national governments enabling the state to act entrepreneurially and deliver on mobile money innovations. Here, explaining why state authorities, such as the Central Bank of Kenya, acted entrepreneurially and allowed a new technology to blossom is as important as understanding why the same technology "failed" in neighbouring countries. But ascertaining the exact reasons why the technology "failed" elsewhere is beyond the scope of this paper.

To summarize, this article documents how the role of the state in the development of financial service technologies in emerging economies can further our understanding of the role of the state in the creation of new markets and in shaping and directing technological change. In particular, the M-Pesa project demonstrates that commercially viable products to alleviate poverty can be developed and are able to service low-income markets. The M-Pesa project has evolved into providing mobile financial services to the majority of the Kenyan population with telecommunications companies predominantly driving the mobile banking model as they were largely exempted from banking regulations (Perselelo Kantai 2010). After approximately 15 years of operation, nearly half of Kenya's Gross Domestic Product flows through M-Pesa (Lalita Clozel 2017).[19] This shows how mobile payment services in Kenya have been described as life-changing for millions of the poorest of the poor by giving them access to bank accounts and financial services (David Wighton 2011).

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[19] The growth of MPesa can be seen, on the one hand, in the scope of its operations. By 2019, it had diversified beyond on-the-spot payments and into lending (micro-finance), micro-insurance, remittances (domestic and international), and current accounts (mobile banking). On the other hand and by some estimates, in 2015 the equivalent of 50 percent of Kenya´s GDP cleared through MPesa (World Bank Group 2019a). Making these matters more complex, the government was a big shareholder of Safaricom, and the company also happened to be the country´s biggest taxpayer, contributing with some $400 million dollars in fees, taxes and dividends in 2014 (*Economist* 2015).

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