

EAST ASIA AND EAST AFRICA: DIFFERENT WAYS TO DIGITALIZE PAYMENTS

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East Asia and East Africa: Different Ways to Digitalize Payments ♦

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Abstract

Financial digitalization leads to the global payment revolution. M-payment is one of the essential digital payment methods that increase the efficiency of financial and economic activities, especially for developing countries. This chapter presents different development paths and adoption models of m-payment in East Asia & East Africa. China and South Korea are examples of third-party platform-led mobile payment models; Japan is an example of a bank-based mobile payment model; while East African countries implemented originally a mobile operator-led model and then moved toward a hybrid model with more banks and mobile operators involvement. It presents finally some concluding remarks and reflections on other world regions.

JEL codes: E42, E44, G23.

Keywords: digitalize payments, mobile payment, mobile payment operational models, East Asia, East Africa

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1. Introduction

Digitalisation encourages traditional financial services providers to innovate in order to achieve more reliable, convenient and secure real-time payment. An adequate payment system is an essential component of a country's monetary and financial system, and is crucial for national economic development. To improve the security and efficiency of payment systems requires the development of an appropriate regulatory regime, more extensive access and low-cost settlement for financial institutions, improved liquidity-saving mechanisms, and more stable and better-organized markets for delivering and pricing various payment services to users (Summers, 1994; Pacifici & Pozzi, 2004).

Including software, hardware, networks, collection, storage, transmission, processing, and presentation of information, the term Information and Communication Technologies (ICTs) refers to a comprehensive range of IT technologies that address and manage electronic data. The financial innovation of ICTs encourages dramatic changes in the current financial industry: digitalization could diminish the marginal costs of financial institutions, lead to buoyant economies of scale, and improve efficiency in financial services (Ramanzan E, 2021). The research of Alshubiri et al (2019) demonstrates that ICTs could facilitate the interactions and operations of financial institutions through their digital networks, resolve time constraints and reduce distance to increase the efficiency of financial and economic activities. The rapid growth of ICTs has changed the payment systems in many emerging and developing countries, and increased people's familiarity with technology and its use for everyday activities (Waverman L. et al, 2005; Pradhan R.P. et al, 2018).

The research of EMR (2020) and Mordor Intelligence (2020) show that the mobile payments market was valued at USD1449.56 billion in 2020, and is expected to reach USD5399.6 billion by 2026. AliPay, WeChat Pay, PayPal, Samsung Pay, Apple Pay, Amazon Pay, and Google Pay, are among the best known global mobile payment applications. Use of

m-payment solutions can allow developing countries to leapfrog traditional card-based payment systems. There are three features of a successful cashless payment implementation: (1) the digitalization of the local implementation environment; (2) the relative novelty of a given payment technology solution in a country at a specific point in time; and (3) the development status of the national infrastructure (Dennis et al., 2021).

Despite financial digitalization, in Europe, most of the new digital payment solutions are still primarily based on traditional cards or bank transfers, which are offered by banks, card companies and financial technology firms (European Commission, 2020). The digital revolution has prompted few changes apart from opportunities to use credit cards and specific applications, such as PayPal, to make online payments. However, in East Asia and in East Africa, the widespread diffusion of mobile devices and innovative businesses has made radical changes to both distant and proximate payments.

The Digital 2020 Report (Hootsuite/We Are Social, 2020b) shows: (i) that Internet penetration rates reached 63% in East Asia and 23% in Africa; and (ii) that the mobile connectivity ratios (this value might exceed 100%, due to individual use of multiple connections), by region, were 114% in East Asia and 60% in East Africa. Although the levels and forms of adoption are different in these regions, in both cases the advances of digitalisation have changed habits and reorganized the payment ‘industry’, whereas in Western developed countries neither of these aspects has changed.

This chapter discusses how the successful adoption of m-payment technologies differed in both regions, for example, why it did not involve the same kind of operators and the same technical solutions. Section 2 presents a classification of mobile payment operational models. Section 3 presents the general background of M-payment in East Asia and East Africa. Sections 4 and 5 highlight different development paths and adoption models of m-payment in East Asia

and East Africa. We consider the consequences of these differences for each region's current and future financial intermediation and financial systems. Finally, we make concluding remarks and offer some reflections on other world regions.

2. The classification of mobile payment operational models

Mobile payment models can be classified according to different types of service providers. Miao and Jayakar (2016), Téllez and Zeadally (2017) show that the mobile payment value chain can include financial services providers (such as banks, financial institutions, etc.), third-party payment services providers (e.g., Alipay, WeChat Pay, Google Wallet, Paypal), mobile operators, service providers (such as transport companies, public utility companies, etc.), equipment providers (such as manufacturers of mobile phones and chips and terminal equipment providers), system integrators, merchants and mobile phone consumers.

TABLE 1.1 Classification of mobile payment operational models

Types of mobile payment operational models	Description
1. Bank-led model	Banks offer mobile payment services independently, are responsible for transactions and retain all the profit. Mobile operators are responsible only for providing the information access channel; they do not participate in the operation and management of the payment system.
2. Mobile operator-led model	The mobile account is considered the payment account and is linked to the user's telephone number. Mobile transaction charges are collected directly by mobile operators. Payments are deducted directly from the mobile account.

3. Third-party payment platform-led model	Third party online payment platforms are independent of banks and other financial institutions; they play an intermediary role and are responsible for transactions. They connect consumers, banks and merchants, provide lower cost banking services and increase the trading parties' trust.
4. Hybrid models	Mobile operators and banks work together to provide the mobile payment service. This model exploits the mobile operator's network and customer relationships and the banks' electronic payment technology, security and credit management expertise, and overcomes the limitations of both these parties.

Table 1.1 shows that bank-led, mobile network operator-led, third-party platform-led, and hybrid models, are the four main types of mobile payment operational models (Ondrus and Pigneur, 2006; Chaix and Torre, 2011; Zhao and Sun, 2012; Mishra and Bisht, 2013; Miao and Jayakar 2016; Koch et al., 2020).

The bank-led mobile payment model has a high level of bank involvement and a low level of mobile operator involvement. The mobile network operator-led model has a high level of mobile operator involvement and a low level of bank involvement. The third-party platform-led model means third-party online payment platforms work as independent intermediaries with a low bank or mobile operator involvement. The hybrid model involves financial institutions and mobile operators collaborating in the management of tasks.

3. The general background of M-payment in East Asia and East Africa

The universalization of the Internet has enabled rapid expansion and the adoption of smartphones, allowing m-payment by electronic devices, as well as payments and receipt of money without the need for traditional cash or cheques (Chawla and Joshi, 2019). Téllez and Zeadally (2017) summarize by suggesting that m-payment can be widely accepted by satisfying the following conditions: (1) simplicity and usability, (2) universality, (3) interoperability, (4) security, privacy and trust, (5) low transaction cost and convenience, and (6) accessible globally. Tiago et al. (2016) demonstrate that compatibility, perceived technology security, performance expectations, innovativeness, and social influence could, directly and indirectly, affect the adoption and recommendation of m-payment.

The advantages that m-payment provides are lowering transaction costs significantly and increasing financial transparency, improving business record-keeping and reducing cash-related fraud (Staykova and Damsgaard, 2015; Ligon et al., 2019, Setor et al., 2021). Singh et al. (2019) suggest there are ten success factors related to the adoption of digital payment: the perceived ease of use, perceived functional benefits, awareness, availability of resources, governmental policy, performance expectancy, social impact, price value, experience and habit, and risk-taking capability. Debit/credit cards, mobile payments and online payment systems are standard digital payment solutions (Iman, 2018) and m-payment is the main digital payment method in several developing countries, such as China, South Korea, Kenya, Indonesia and Brazil (Setor et al., 2021; Maurer, 2012).

China and South Korea are cashless payment solution leaders in east Asia. Chinese e-commerce will account for 11.6% of Chinese GDP in 2022 and, based on a robust national infrastructure, South Korea will be the top cashless country in 2022 (Global Data, 2020). By 2025, the Japanese government intends to increase cashless payments from the current 20% to 40% of all transactions by 2025 (South China Morning Post, 2021). According to the 2018 Asian Digital Transformation Index (Economist Intelligence Unit, 2019), Japan is ranked 3rd

for digital infrastructure (58.9), with South Korea (54.3) and China (35.7) in 4th and 8th places, respectively. The Digital 2020 April Global Statshot Report ranks South Korea 2nd and China 4th for mobile Internet connection speed (Hootsuite/We Are Social, 2020a).

China had experienced a payments revolution: mobile payments have diffused rapidly in the space of less than a decade. In 2019, the value of mobile payment transactions in China increased by 25% compared to 2018, to reach RMB347.11 trillion (People's Bank of China, 2020). Tencent's WeChat Pay and Alibaba's Alipay system dominate China's mobile payment market.

South Korea also has a well-established mobile or m-payment infrastructure and has recently become the first walletless nation. The transaction value of mobile wallet payments was KRW143.4 trillion (USD124.2 billion) in 2019, increased by 79% compared to 2018 (Global Data, 2021). South Koreans prefer to use smartphones to make both online and offline payment, by using Kakao Pay, Naver Pay, Samsung Pay and tec.

The use of m-payment has developed more rapidly in Japan than in Western developed countries. The Yano Research Institute (2018) estimates that the Japanese domestic mobile payment transaction will increase from JPY1.303 trillion in 2018 to JPY1.66 trillion in 2019. PayPay, LINE Pay, Origami Pay, D-barai, merPay, Pixiv, Apple Pay, and Google Pay are popular Japanese mobile payment services.

The story of the adoption and use in East-Africa took a different form than in Asia: in this case, the M-Pesa/Safaricom model played a leading role: Kenya was associated with this initiative mostly because Safaricom was a Kenyan company. The Safaricom/Kenyan experience was then repeated in neighbouring countries: the more Safaricom was present there, the faster the adoption was, until different regional operators proposed the same range of services as M-Pesa. Between China, South Korea and Japan, service providers, uses and even

technologies differ. In contrast, in East Africa, there is a dominant operator, the same use and technology among countries.

In East Africa, mobile payments have been an essential part of life for more than ten years. For example, in Kenya, Tanzania and Uganda, the number of m-payment accounts has overtaken the number of bank accounts and the volume of m-payments continues to show strong growth. The Central Bank of Kenya announced that in 2019 mobile money transactions in Kenya were valued at USD38.5 billion, almost half of Kenya's GDP. East Asian countries have followed various paths of digital payment development with different operators. In contrast, East African countries demonstrated similar development models. M-Pesa and its mother company Safaricom have initiated a model where distant transfers are more common than proximity payments, where telephonic operators, with or without local banks as partners, never left the lead to Internet service providers, where national frontiers played few roles in the extension of technical services.

4. M-payment in East Asia

4.1 M-payment in China

4.1.1. The general background on M-payment in China

Historically, China was a cash economy and the exchange model was cash dominated (Klein, 2019; Torre and Xu, 2019). However, the largest Chinese currency note is RMB100 (around USD15), whereas the US has USD100 bills and European countries have Euro500 notes. As a result, cash payment has become inconvenient for high-value transactions in China.

In addition, the adoption of card-based terminals in China was not in line with the issuing of bank cards. China has a large card network with 8.95 billion cards, of which 8.17

billion are debit cards and only 778 million are credit cards (People's Bank of China, 2021). However, the adoption of card-based point-of-sale or POS terminals by Chinese merchants has been slow. At end of 2020, there were only 30.89 million POS terminals in China (People's Bank of China, 2021). The reluctance of merchants to acquire POS terminals and the problems related to cash payments triggered the development of an alternative payment method.

Compared to South Korea and Japan, China is a latecomer in the ICT sector. However, following years of technological innovation and development, China's digital payment market made dramatic progress and in 2020 China became the leader of digital payments. One of the peculiarities of the Chinese economy has been its rapid adoption and widespread diffusion of mobile payments. According to the 47th China Statistical Report on Internet Development, released by the China Internet Network Information Center (2021: 49), by the end of 2020, the number of Chinese mobile payment users had reached 853 million, an increase of 87.44 million since March 2020, and accounted for 86.5% of Chinese mobile netizens. Mobile payments enabled by smartphones and Quick Response (QR) codes have caused disintermediation in China's banking system (Klein, 2019).

The 2020 Communications Industry Statistics Bulletin, published by the Ministry of Industry and Information Technology of the People's Republic of China (2021), states that, at the end of 2020, there were around 1.59 billion mobile phone users in China, and mobile phone coverage in China had reached 113.9 sets per 100 people. According to the People's Bank of China (2021) statistics, at the end 2020, digital payments were continuing to grow. During those three months: (i) Chinese banks processed 235.225 billion electronic payments, representing a total of RMB2711.81 trillion (around USD393 trillion, using average closing price of 2020 China/US Foreign Exchange Rate was 6.9), including 123.22 billion mobile transactions with a total value of RMB432.16 trillion (around USD62.6 trillion), respective year-on-year increases of 21.48% and 24.5%; (ii) non-bank entities processed 827.29 billion electronic

payments amounting to RMB294.56 trillion yuan (around USD42.7 trillion) and respective year-on-year increases of 14.9% and 17.88%.

Two leading Chinese digital economy players, Alipay – created by Alibaba (China's version of Amazon), and WeChat Pay – launched by Tencent (China's version of Facebook), have experienced very successful mobile payment innovation and adoption (Klein, 2019; Torre and Xu, 2019, 2020; Yiping et al., 2020). In 2019, Alipay and WeChat Pay were first-tier corporations and accounted for almost 93.8% of the third-party payment market (iResearch Consulting Group, 2020). WeChat is ranked 5th in the global ranking of mobile apps based on average monthly active users, and Alipay is ranked 7th (Hootsuite/We Are Social, 2020a). WeChat Pay and Alipay dominate the Chinese mobile payment market as the primary payment method for most Chinese people, with cash second and debit/credit cards third (Steven, 2017).

4.1.2 Alipay

Alipay, one of China's largest digital payment platforms, provides complete digital payment, digital finance and digital daily life services. It was created in 2004, initially as the financial department of the Alibaba Group's online platform, Taobao.com, to try to resolve the trust issues between buyers and sellers in online transactions, and to act as an e-wallet and a one-stop payment portal. Alipay increased trust between e-commerce sellers and buyers, facilitated online business, and underpinned the expansion of e-commerce in China.

Alipay launched its Alipay mobile payment App in 2009 and its QR code payment system in 2011 (Ant Group Co. Ltd, 2020: 135). In 2013, it launched Yu'eobao to offer Alipay users the opportunity to invest in Alipay's money market fund at the very low purchase threshold of RMB1, around Euro0.13 (Ant Financial Services Group, 2019). Huabei and Jiebei were created in 2014 and 2015 respectively: the former works like a bank credit card and focuses on quick consumer loans for purchases using e-commerce platforms, such as

Taobao.com and Tmall.com (China's version of Amazon); the latter is similar to a bank loan and is used to finance almost anything, from travel to education. At the beginning of 2015, Alipay implemented Zhima Credit, a credit-scoring service: high scoring users have easier access to loans and a more trustworthy profile on e-commerce sites in the Alibaba Group. The AntChain Blockchain-as-a-Service (BaaS) open platform was launched in 2018, to provide an open collaboration platform and convenient services for both enterprises and individuals worldwide, and more equal opportunities. Alipay has developed from a simple payment tool to a one-stop digital daily life platform that offers digital finance, government affairs services, local life services and other services in various sectors. By end June 2020, Alipay had operations in more than 200 countries and regions, over 1 billion annual active users (numbers of people using the Alipay App in the previous 12 months), and more than 80 million monthly active merchants (merchant accounts that completed at least one transaction during that month) and over 2,000 financial institution partners (Ant Group Co. Ltd, 2020).

Focusing on individual consumers and small businesses whose financial requirements are substantially underserved in China, Alipay cooperates with financial institution partners and implements digital financial solutions for its participants. For individual consumers, Alipay provides digital payments, consumer credit, asset management and insurance services, and daily life services provided by third parties, such as food delivery, transportation, entertainment and access to municipal resources. For business clients, Alipay offers collection and payment services and digital finance, for example, SMB or Server Message Block credit and investment products. Financial institutions use the Alipay platform to distribute credit, investment and insurance products.

4.1.3 WeChat Pay

WeChat started as a simple messaging App (China's version of WhatsApp) and was launched by Tencent in 2011 as Weixin (Mandarin for micro-message). It developed to provide services similar to Facebook, WhatsApp, Instagram, Uber, Apple pay, etc. WeChat now combines functions including instant messaging, voice and video calls, social space (WeChat Moment), short videos (WeChat Channel), e-commerce (WeChat Business), mini-programs, online games, digital payment (WeChat Pay), asset management, ebooks (WeChat Reading), a corporate communication and office tool (Enterprise WeChat), etc.

The initial features offered by WeChat were the basic text messaging, voice clip creation and photo sending services. In August 2011, it added video clips and a 'find nearby users' function. WeChat launched its voice and video calls function and went international in 2012 with updated versions in the English, Thai, Vietnamese, Indonesian and Portuguese languages. Several revolutionary features were introduced in 2013, for example, WeChat Pay, WeChat Official Accounts, WeChat Emojis and WeChat Games.

In China, there is a tradition of giving red envelopes containing money as new year, birthday and wedding gifts, especially from parents to children, and from other family members. During the 2014 Spring Festival, WeChat introduced its WeChat Red (virtual) Envelope, and more than 8 million Chinese people sent over 40 million WeChat Red Envelopes of good wishes to relatives and friends. The popularity of this digital exchange' seeded the WeChat Pay accounts of many customers with initial funds and further increased WeChat Pay's penetration (Torre and Xu, 2020). Since then, WeChat has become a very popular, multi-functional social media App and has been downloaded by almost every Chinese mobile phone user.

Tencent (2021) announced that, at the end of 2020, there were 1.225 billion active monthly WeChat users. In less than ten years, WeChat had evolved from a real-time communication application to a communication and social network platform that meets the

digital needs of more than 1.2 billion users. Every day, more than 120 million users post content on WeChat Moment, 360 million users read WeChat articles and around 400 million users employ mini programs (Tencent, 2021). In addition, Enterprise WeChat has become indispensable as a communication tool for remote office working and serves more than 5.5 million corporate customers (Tencent, 2021).

4.1.4 QR code adoption in China

QR codes are modern two-dimensional bar codes with large data storage capacity for information such as contact details and digital payments. They differ from the linear product barcodes in terms of their huge data storage capacity, scanability using a screen, readability (even if slightly damaged) and data encryption which provides security.

QR codes are an essential component of China's digital payment revolution. In the third quarter of 2020, transaction amounts related to QR code payment reached around RMB10 trillion, an increase of 19.4% compared to the previous three months (iResearch Consulting Group, 2021). Both Alipay and WeChat Pay make extensive use of the QR code: app users employ them for their personal accounts and merchants use them in their stores, on products, and for advertisements.

QR codes enable merchants to access payment systems without using an Internet connection; only the payer needs to be connected for the payment transaction. Merchants need to supply a printed QR code that the consumer can scan using a smartphone and go online to process the payment transaction. This lowers the merchant's costs and increases the payment benefits (e.g., speedier payment process), further facilitating m-payment adoption (Yan et al. 2021).

4.2 M-payment in South Korea

4.2.1 The general background of M-payment in South Korea

South Korea has a well-developed digital payment market and high levels of smartphone adoption and Internet penetration. The Asia Pacific eCommerce and Payments Guide 2020 states that in 2019 Internet penetration in South Korea was 91.8% and smartphone penetration was 88.5% (Rapyd, 2020).

Prior to 2014, South Korea's mobile payment industry was strictly controlled. This resulted in much lower demand for e-payment services in Korea compared to some other countries and in the continuing use, by Korean consumers, of traditional financial methods, such as credit cards and Internet banking. In 2015, the regulation changed and South Korea became a more creative and innovative environment for the Fintech industry. Financial systems were restructured to fit the online and mobile environment, supported by funding for fintechs, and the barriers to electronic financing were lowered (MSIP and KISA, 2015). In April 2015, the Ministry of Science, ICT and Future Planning (MSIP) announced a strategy aimed at reducing the use of the ActiveX framework by private sector finance, education and entertainment organizations, and promoting more convenient digital payment methods.

Korean users register their credit cards on Naver Pay (introduced in 2015 by Korea's leading portal site operator, Naver) or Kakao Pay (launched in 2014 by the internet giant Kakao) to enable online shopping; this is similar to the US Paypal system. In 2015, the smartphone manufacturer, Samsung Electronics, launched Samsung Pay, which uses Near Field Communication (NFC) and magnetic secure transmission technologies. In 2018, Kakao Pay launched a QR payment option and the South Korean government implemented Zero Pay.

The potential offered by Fintech developments has resulted in many traditional Korean financial institutions, technology companies and even government launching mobile payment services. The Korean government has a strong incentive to achieve a cashless transformation

and the Bank of Korea's Coinless Society Project, launched in April 2017, has further promoted FinTech payments.

According to the survey of Rapyd (2020), around 36% of South Koreans have opted for mobile payments (or what Koreans call 'simple' payments, via Kakao Pay, Samsung Pay and Naver Pay, compared with 30% who prefer domestic card payments, 15% who prefer international card payments and 13% who favour bank transfers. The transaction value of mobile wallet payments grew from KRW12.0 trillion (USD10.4 billion) in 2016, to an estimated KRW209.7 trillion (USD181.6 billion) in 2020, and is expected to reach KRW581.3 trillion (USD503.5 billion) in 2024 (Global Data, 2021).

4.2.2 Kakao Pay and Naver Pay

Simple payments allow South Korean consumers to pay for goods and services easily, both online and offline. Kakao Pay is used by 41% of consumers, Naver Pay 34% and Samsung Pay by 32% (Rapyd, 2020). According to a Rakuten Insight survey of e-payment usage, around 84% of respondents had made at least one transaction using an e-payment method, with the most popular among South Korean respondents, being Naver Pay (53% of respondents), followed by Kakao Pay and Samsung Pay (respectively around 50% and 40% of respondents) (Statista, 2021).

Kakao Pay, South Korea's top ranked mobile payment service provider, was launched in April 2014 as a fintech subsidiary of Kakao. By the end of 2019, Kakao Pay had more than 20 million active monthly users, over 30 million accumulated users, and a turnover in 2019 of around 40 billion dollars (KRW48 trillion) (Kakao, 2020). Kakao is one of the largest Internet companies in South Korea and provides a range of services such as instant messaging (Kakao Talk), image, video, and music sharing (Kakao Story), a music app (Kakao Music), a mobile fashion service (Kakao Style), a mobile e-wallet (Kakao Pay), a mobile bank (Kakao Bank),

investment and venture capital (Kakao INV and Kakao Ventures), etc. Kakao Pay is incorporated with Kakao Talk and allows Kakao Talk users to pay for e-commerce products and services through the messaging App. It aims to lead the wallet-free society revolution, to allow economic activities to take place anytime, anywhere with the intermediation of a smartphone. It has extended its services with the addition of innovative life finance services such as online and offline payments, remittances, memberships, bills and authentication. In February 2017, Ant Financial Service Group (the parent company of Alipay) invested USD200 million in Kakao Pay and became its second-largest shareholder. This strategic partnership enabled the use of a QR code payment service, compatible with Alipay, and facilitated international e-commerce at Alipay-supported stores and businesses abroad.

Naver Pay was launched in 2015, by Naver, South Korea's main web portal. It integrates online shopping, convenient in-app payments, electronic financial transaction functions, etc. Naver has a large market share and receives 30 million visits daily on average. The number of monthly users of NAVER Pay reached 12 million at the end of 2019 (Naver, 2020) and in that same year, Naver decided to make Naver Pay a separate entity. Naver Financial is an innovative financial platform offering exceptional services.

4.3 M-payment in Japan

4.3.1 The general background of M-payment in Japan

Unlike developments in China and South Korea, in Japan digital payment advances have been slow. In Japan, more than 80% of transactions still involve cash; fewer than 20% of transactions use cashless payment methods, such as credit cards, electronic money and mobile payments. This historical 'preference for cash', which is observed, also, in Germany, has reduced the use of credit cards for small and medium-sized payments. In 2004, Japan launched

a mobile wallet, a world mobile commerce innovation created by NTT DotCoMo (Japanese mobile operator); however, Japan's ageing population remains strongly linked to cash (PYMNTS, 2020).

The Japanese government has been making huge efforts to promote digital payment. In 2017, the Ministry of Economy, Trade and Industry issued a policy document entitled Cashless Vision, which set a target of 40% of digital payments in 2027 from the 2017 level of 18%. The Yano Research Institute (2018) estimates that the Japanese domestic mobile payment transaction will grow from JPY1 trillion in 2017 to JPY4.3 trillion in 2023.

In 2019, the Japanese government launched its Cashless project: until the end of June 2020 the government-funded rebate amounts to 2% of the total purchase amount at major retailers and 5% at small- and medium-sized merchants and is available, and consumers can take advantage of the discount by using any of a wide range of payment options, such as credit, debit, prepaid and transit cards, Apple Pay and Google Pay, plus QR mobile payments services such as Line Pay, PayPay and Rakuten Pay. (Japan Cashless Promotion Council, 2019). These actions hugely boosted use of digital payment in Japan.

The Asia Pacific eCommerce and Payments Guide 2020 (Rapyd, 2020) shows that, in 2019, Japan was the second-largest e-commerce market in the Asia-Pacific region with a market value of USD150.1 billion and a mobile commerce market worth USD36.6 billion. In 2019 Internet penetration was 91% and smartphone penetration was 47% (Rapyd, 2020). By end 2020, there were about 186 million mobile subscribers in Japan (Telecommunications Carriers Association, 2020).

4.3.2 PayPay and Rakuten Pay

Based on the July 2020 Smartphone Payment Usage Trend Survey of Mobile Marketing Data Laboratory (MMDLabo, 2020), the main payment methods were cash (90.2% usage rate),

credit card (73.4% usage rate), smartphone payments (37.8% usage rate) including Near Field Communication (NFC) payments and QR code payments, public transport IC card (27.9% usage rate) and non-public transport IC card (21.6% usage rate). The survey results show, also, that 93.3% of respondents recognized QR code payments and 34.3% were QR code payment users and, among these, PayPay was the most used QR code payment (48.7%), followed by Rakuten Pay (15.7%), d Payment (13.4%) au Pay (10.3%) and LINE Pay (6.2%) (MMDLabo, 2020).

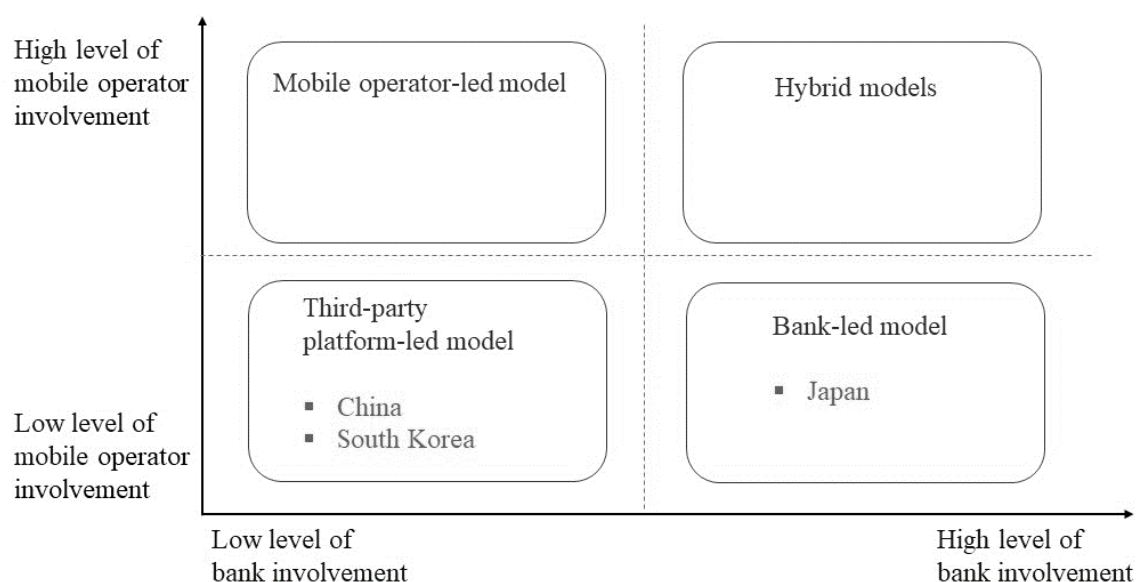
PayPay is a joint venture, established by SoftBank Group Corporation and Yahoo Japan Corporation, in autumn 2018. It offers smartphone payment services, using QR code technology, supported by India's largest digital payment company, Paytm, a SoftBank investee (SoftBank, 2018). By the end of February 2021, PayPay had over 36 million users in Japan. On 1 March, 2021, the SoftBank Group Corporation completed a merger between its Japanese Internet business and the messaging service operator, Line Corporation. It intended to combine these entities' payment apps to give PayPay access to users of Line Corporation's messaging services (Alpeyev, 2021).

Rakuten is a Japanese e-commerce and online retailing company whose businesses include worldwide e-commerce, fintech, digital content and communications. The Fintech Groupe offers a variety of services, such as digital payment (Rakuten Pay, Rakuten Point Card, Rakuten Edy, etc.), Internet banking (Rakuten Bank), credit card issuing (Rakuten Card), online brokerage (Rakuten Securities) and insurance (Rakuten Insurance General Information Center, Rakuten Life Insurance, Rakuten General Insurance, etc.). In the last quarter of 2020, the Fintech Groupe's segmentation revenue accounted for 32.6% of the total revenue. In 2012, Rakuten introduced Rakuten Pay, primarily to support small and medium-sized businesses with no POS system and, in late 2016, launched the Rakuten Pay app (Rakuten Today, 2019).

4.4 Mobile payment operational models in East Asia

In Section 2, we referred to the high level of bank involvement and low level of mobile operator involvement in the bank-led mobile payment model, and the high level of mobile operator involvement and low level of bank involvement in the mobile network operator-led model. The third-party platform-led model relies less on banks and mobile operators, and the hybrid model relies heavily on cooperation between banks and mobile operators.

**FIGURE 1.1 A classification of mobile payment operational models
in China, South Korea and Japan**



WeChat Pay and Alipay belong to third-party payment platforms. Kakao Pay, Naver Pay and Samsung Pay also have little bank and mobile operator involvement. Therefore, China and South Korea are examples of third-party platform-led mobile payment models (see Figure 1.1).

For the Japanese cases of PayPay and Rakuten Pay: PayPay, backed by SoftBank, Yahoo Japan, a 1996 joint venture between SoftBank and Yahoo, and Paytm an investee of SoftBank. Rakuten launched Rakuten Bank, two years before implementing Rakuten Pay, and introduced Rakuten Card, which increased the penetration of PayPay. Both cases depend

heavily on financial service providers – that is, banks. Thus, Japan is an example of a bank-based mobile payment model (see Figure 1.1).

5. M-payment in East Africa

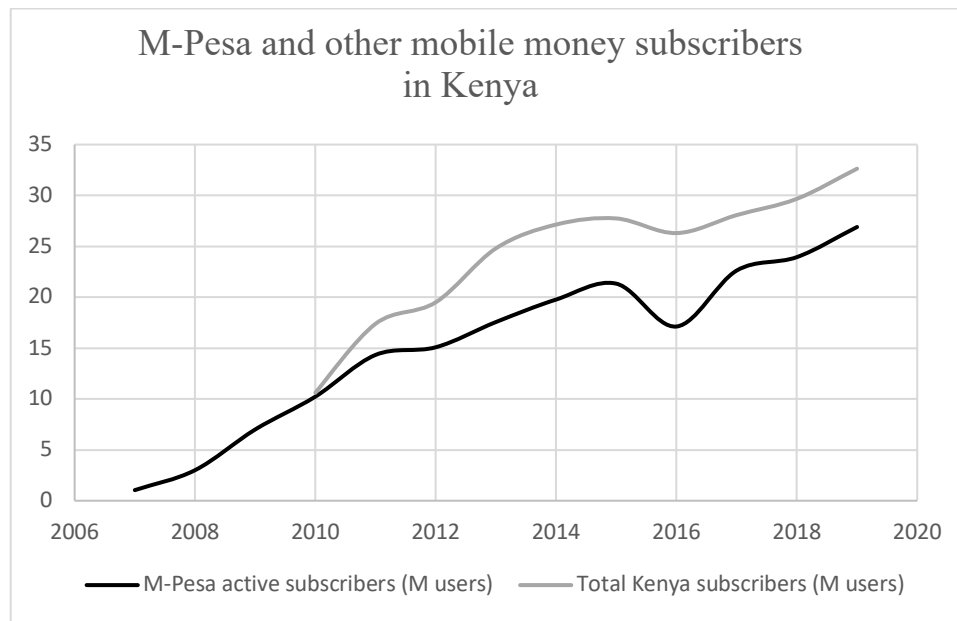
5.1 The Safaricom Kenyan story

5.1.1 The operator centric phase

The East Africa story of m-payment solutions began in Kenya as an initiative of Vodafone, still the leading m-payment operator in this part of Africa. In this country, which served as a testing ground for other experiences in East Africa, they initially proposed simple solutions able to work without any Internet connexion, and then they improved the service, in collaboration with local banks. (Jack et al., 2010 ; Mbiti et al., 2014 ; Chaix and Torre, 2015)

In 2007, Safaricom, a Kenyan subsidiary of Vodafone, proposed an innovative service adapted to an environment where only first-generation mobile phones, with no Internet connection or advanced functionalities, were available. M-Pesa was implemented as a transfer service, enabling deposits and withdrawals of money from a network of agents, transfers of money to other users and non-users, bill payment and purchase of phone minutes. Transmissions were based on unstructured supplementary service data technology, which had a low level of reliability, and ‘certified agents’ enabling both ends of the payments: one to transform notes into electronic signs and the other to transform codes into notes. Users were charged a small fee by the operator. The receiver of the transfer did not have to be registered with M-Pesa, although registration made the transfer order slightly cheaper. All the operations, from the transmission of the code to the contribution of the certified agents, were controlled by the mobile network operator and required no intervention from a financial agent. Therefore, this was an operator centric model (or mobile operator-led model).

FIGURE 1.2 The number of domestic Kenyan subscribers to M-payment (millions)



Source: the author's own work, based on the data of Communication Authority of Kenya Annual Reports (2007-2019)

The success of this model (see Figure 1.2), was huge and unexpected. Jack et al. (2013) state that the growth in these services in parts of the developing world has been remarkable, especially in Kenya: only five years after the launch of M-Pesa, at least 70 percent of households in Kenya have accessed M-Pesa, which became the country's largest mobile money product.. One of the reasons for its success was that it enabled international transactions (Ntara, 2015) and allowed international transfers by immigrants (Morawczynski, 2009; Metzger et al., 2019). However, the main reason for its success was that it allowed local customers to make distant payments without having to use intermediaries. Network dynamics played an important role in its rapid adoption. Chaix and Torre (2015) point to the relevance of a mean field and microeconomic network settings for explaining the diffusion of the Safaricom innovation.

5.1.2 Hybrid models: bancarization and financialization led by telephone operators

Africa has the fastest growth in mobile payment, and mobile payment innovations contribute to economic development and financial inclusion in Africa (Aker and Isaac, 2010; Demircuc-Kunt et al., 2018; Ahmad et al., 2020; Asongu et al., 2020). Following the initial rather frugal solution, and based on its observation that one-third of M-Pesa accounts included otherwise unbanked individuals, Safaricom proposed partnerships with several banks to provide additional services. In 2012, it launched M-Shwari, a joint venture with the Commonwealth Bank of Australia. Users of m-payment services could access loans that were redeemable in 30 days, a rate of 7.5%, and could access saving accounts offering 5% interest. In 2013, Safaricom and Equity Bank launched M-Kesho, which was a more sophisticated version of M-Pesa. It offered access to several banking services without the need for account opening fees, minimum balances or monthly charges, as well as micro-saving, micro-credit and micro-insurance services. M-Kesho accounts paid interest and withdrawals carried a very small cost. This new service provided Safaricom/Vodafone with an involuntary means to increase their client base through an asymmetric operator-bank partnership and offered an efficient way to bancarize Kenya.

5.2 The diffusion of the Kenyan model in other East-African countries

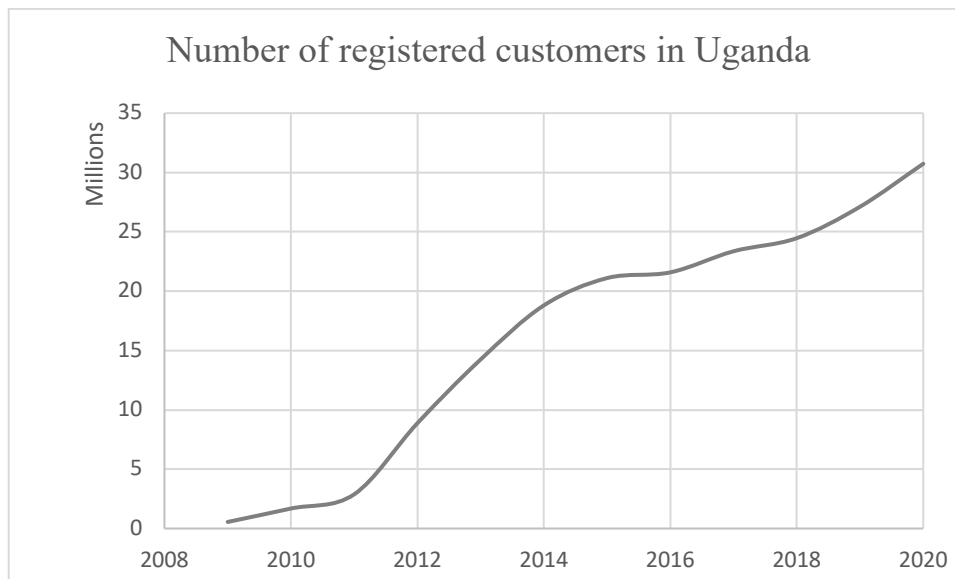
Following the success in Kenya, Vodafone tried to apply the model in other countries. M-Pesa explains that its solution is now available in the Democratic Republic of Congo, Egypt, Ghana, Lesotho, and in the East-African countries Mozambique and Tanzania. The latter, a neighbour of Kenya, was the first to access the M-Pesa service, in 2008, following an initiative by Vodacom, another subsidiary of Vodafone. In 2021, there are now 6 different operators offering m-payment solutions in Tanzania: the share of market of m-Pesa is around 40%,

followed by Luxemburg's Tigo Pesa at around 30%, the Indian Airtel at 20% and other minor operators with the last 10%. In this country, the M-Koba solution has recently been launched by Vodacom, in cooperation with TPB bank, to promote savings groups, to access loans and share earnings.

M-payment has been the main driver of the increased financialization of Sub-Saharan Africa (Chaix and Torre, 2015; Llewellyn-Jones, 2016; Mazer and Rowan, 2016; Beck et al., 2018; Dissaux, 2019). What is interesting is that Safaricom continued to offer the possibility to subscribe to its initial frugal service, despite the later versions being more secure and more sophisticated. The dual offer facilitated the adoption of full banking services by previously unbanked customers and was probably very relevant for the subsequent adoption of new banking services by new users

In many countries, Vodafone was/is not dominant or the leader, but the same scenario as that applied than in Kenya was followed, only sometimes with a delay. MTN, the largest South African operator, launched the MMT (Mobile Money Transfer) in many African countries, including Uganda (see Figure 1.3) and Rwanda in East Africa. In each case, the introduction of mobile payments under the MTN initiative has also impacted the financialization of economies. If Vodafone was the first mover, it was not the only telephonic operator able to supplement the banks in some of their areas of competence and to perpetuate an operator centric model which seems so unsuitable in Asia.

FIGURE 1.3 The number of domestic Ugandan subscribers to M-payment (millions)



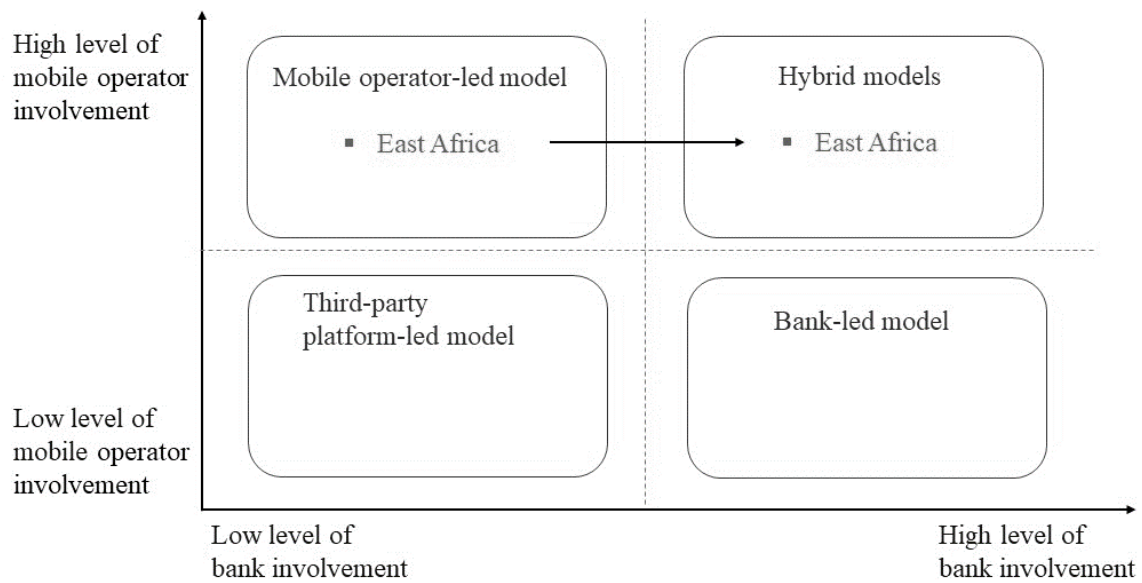
Source: the author's own work, based on the data of Central Bank of Uganda (2009-2020)

For many years, East Africa was the leader in terms of implementation of mobile-money solutions; however, based on subscriber numbers, West Africa now dominates. In this region, which has the most French-speaking countries, the main operator is Orange, which uses a more advanced technology than Vodaphone and has worked to create an international m-payment ecosystem among countries that use the same currency (CFA franc) linked to the euro via a fixed exchange rate system. Interoperability seems to be the key to Orange's success, in a world region that includes countries that are too small to impose a national strategy (GSMA, 2019).

5.3 Mobile payment operational models in East Africa

According to the classification of Ondrus and Pigneur (2006) - Chaix and Torre (2011, 2015), the East Africa mobile payment implementation model was clearly a successful operator centric framework (mobile operator-led model) (see Figure 10.4), which, over time, evolved from an imaginative use of a frugal technology to the provision of more advanced financial services, but focused always on the specific needs of local populations.

**FIGURE 1.4 A classification of mobile payment operational models
in East Africa**



Source: the author's own work

However, in recent years, more and more banks in Africa are beginning to compete aggressively for mobile banking customers and partnering with mobile operators to facilitate mobile money transactions (Chironga, 2017). In 2020, Ecobank launched a digital payment service, Rapidtransfer International, for instant cross-border payments between Europe and the 33 African countries where Ecobank operates. In February 2021, Mastercard and MTN announced a strategic partnership, combining a Mastercard virtual payment solution linked to the MTN MoMo wallet, to enable millions of consumers in 16 countries across Africa to make global e-commerce payments safely and securely (MTN Group, 2021). Therefore, in my view the African traditional mobile operator-led model has moved toward a hybrid model with the involvement of more banks and mobile operators (see Figure 1.4).

Conclusion

This chapter shows that, despite a common trend towards increased use of m-payment solutions, adoption patterns differ among continents, and the pace of adoption differs among countries – even on the same continent. In Asia, initially, distant payment was introduced to

allow payments online using mobile phones in virtual marketplaces. However, it is proximity payment that has led to increased adoption of m-payment in this region. In Africa, only distant payments have remained attractive and led to new practices, despite not very secure technologies. These differences are likely due to the type of need and the level of development in these regions. In Asia, the business models were mostly introduced by the Internet service providers, which used m-payment to extend their activities into the finance, banking and insurance sectors. The emergence and economic success of fintechs in Asia owe much to this payment revolution. In Africa, which was an earlier adopter of m-payment before the diffusion of smartphones and 3G and 4G standards, it was the telephone operators who were best placed to provide the service and, despite the greater availability of mobile Internet, their supremacy has not been contested. This is due, in part, to their joint-ventures with local banks in a bid to enlarge the range of services provided.

Based on the above, it is likely that the relative slowness related to the take-up of mobile payment in Western developed countries is due to a lack of encouragement from the market incumbents, that is, the major credit cards issuers. The improvements that have been made to their services have reduced the need for a transition to a technologically more advanced solution and limited the development for existing functionalities, such as generalizing the contactless payment in recent years. Since more and more travellers prefer using m-payment for travel-related services, especially Asian travellers, and since service providers could implement mobile payment options to attract and better serve travellers, it is a good opportunity for the tourism industry to be a pioneer in leading economic growth through mobile payment (World Travel & Tourism council, 2019; Tangit and Law, 2021; Wu et al. 2021). Policymakers and regulators could encourage the implementation of m-payment to maximize the opportunities that mobile payment systems can bring to an economy. Additionally, mobile payment also impacts migrants' remittances (Kosse and Vermeulen, 2014; Darmon, 2016). Thanks to its low

cost, convenience and security, m-payment facilitates the transfer of remittances from migrants to family members, distant family members, or even migrants themselves. Western developed countries could use m-payment to stimulate the safety, efficiency and integrity of the international remittance market.

References

Ahmad A. H., Green C., Jiang F. (2020). Mobile money, financial inclusion and development: a reference to African experience. *Journal of Economic Surveys*. Volume34, Issue4, Page 753-792. Retrieved from <https://doi.org/10.1111/joes.12372>

Aker J. C., and Isaac M. M. (2010). Mobile Phones and Economic Development in Africa. *Journal of Economic Perspectives*, Volume 24, NO. 3, Page 207-232

Allam Z. (2020). Chapter 8 - The Forceful Reevaluation of Cash-Based Transactions by COVID-19 and Its Opportunities to Transition to Cashless Systems in Digital Urban Networks. *Surveying the Covid-19 Pandemic and its Implications*. Elsevier, 2020, Pages 107-117, ISBN 9780128243138.

Alpeyev P. (2021). SoftBank to Merge PayPay and Line Pay Apps in Japan. Retrieved from <https://www.bloomberquint.com/business/softbank-is-said-to-merge-paypay-and-line-pay-apps-in-japan>

Alshubiri F., Syed Ahsan Jamil S. A., Elheddad M. (2019). The impact of ICT on financial development: Empirical evidence from the Gulf Cooperation Council countries. *International Journal of Engineering Business Management*. Volume 11: 1–14.

Anderson R.M., Heesterbeek H., Klinkenberg D., Hollingsworth T.D. (2020). How will country-based mitigation measures influence the course of the COVID-19 epidemic? *The Lancet*, Vol. 395, Issue 10228, Pages 931-934. Retrieved from [https://doi.org/10.1016/S0140-6736\(20\)30567-5](https://doi.org/10.1016/S0140-6736(20)30567-5)

Ant Financial Services Group. (2019). Ant Financial History. Retrieved from <https://www.antfin.com/history.htm>

Ant Group Co. Ltd. (2020). Ant Group IPO prospectus. Retrieved from <https://www1.hkexnews.hk/listedco/listconews/sehk/2020/1026/2020102600165.pdf>

Asongu S. A., Biekpe N., Cassimon D. (2020). Understanding the greater diffusion of mobile money innovations in Africa, *Telecommunications Policy*, Volume 44, Issue 8, ISSN 0308-5961, <https://doi.org/10.1016/j.telpol.2020.102000>.

Beck, T., Pamuk, H., Ramrattan, R., Uras, B. R. (2018). Payment instruments, finance and development. *Journal of Development Economics*, Vol. 133, Pages 162-186. Retrieved from <https://doi.org/10.1016/j.jdeveco.2018.01.005>

Chaix, L., Torre, D. (2011). Four models for mobile payments. Retrieved from https://www.researchgate.net/publication/267917243_Four_models_for_mobile_payments

Chaix, L., Torre, D. (2015). The dual role of mobile payment in developing countries. *Revue économique*, Vol. 66, Issue 4, Pages 703-727. Retrieved from <https://doi.org/10.3917/reco.664.0703>

Chawla D., Joshi. H. (2019). Consumer attitude and intention to adopt mobile wallet in India—An empirical study *Int. J. Bank Market.*, Vol. 37, Issue 7, Pages 1590-1618

China Internet Network Information Center. (2021). The 47th China's Statistical Report on Internet Development. Retrieved from http://www.cac.gov.cn/2021-02/03/c_1613923423079314.htm

Chironga M., Grandis H. D., Zouaoui Y. (2017). Mobile financial services in Africa: Winning the battle for the customer. McKinsey report.
<https://www.mckinsey.com/~/media/McKinsey/Industries/Financial%20Services/Our%20Insights/Mobile%20financial%20services%20in%20Africa%20Winning%20the%20battle%20for%20the%20customer/Mobile-financial-services-in-Africa-Winning-the-battle-for-the-customer.pdf>

Communication Authority of Kenya Annual Reports. (2007-2019). Retrieved from <https://ca.go.ke/downloads/publications/annual-reports/>

Demirguc-Kunt A., Klapper L., Singer D., Ansar S., Hess J. (2018). Base de données Global Findex 2017 : Mesurer l'inclusion financière et la révolution technico-financière. World Bank.
<https://openknowledge.worldbank.org/handle/10986/29510>

Darmon E., Chaix L., Torre D. (2016). M-payment use and remittances in developing countries: a theoretical analysis. *Revue d'Economie Industrielle*. 4e trimestre. No 156.
<https://doi.org/10.4000/rei.6469>

Dennis N., Robert J. K., Paul G., Jonas H. (2021). Can we classify cashless payment solution implementations at the country level? *Electronic Commerce Research and Applications*, Vol. 46, 2021, 101018, ISSN 1567-4223, Retrieved from
<https://doi.org/10.1016/j.elerap.2020.101018>

Dissaux, T. (2019). Inclusion financière et liens sociaux: la monnaie entre marchandisation et mise en commun au Kenya. *Mondes en développement*, Vol 1, pages 83-108.

Economist Intelligence Unit. (2019). The 2018 Asian Digital Transformation Index (ADTI), Retrieved from <http://connectedfuture.economist.com/wp-content/uploads/2018/12/ADTI-whitepaper.pdf>

EMR. (2020). Global Mobile Payment Market. Retrieved from
<https://www.expertmarketresearch.com/reports/mobile-payment-market>

European Commission. (2020). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS on a Retail Payments Strategy for the EU. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0592&rid=2>

Global Data. (2020). Top countries moving toward a cashless society by 2022. revealed by Global Data. London, January 13. Retrieved from <https://bit.ly/3ntKrzQ>.

Global Data. (2021). Mobile wallet payments in South Korea to surpass US\$500bn in 2024. Retrieved from <https://www.globaldata.com/mobile-wallet-payments-south-korea-surpass-us500bn-2024-reveals-globaldata/>

GSMA. (2019). 2019 State of the Industry Report on Mobile Money.
<https://www.gsma.com/sotir/wp-content/uploads/2020/03/>

Hootsuite/We Are Social. (2020a). Digital 2020 April Global Statshot Report. Retrieved from <https://wearesocial.com/blog/2020/04/digital-around-the-world-in-april-2020>

Hootsuite/We Are Social. (2020b). Digital 2020 China. Retrieved from <https://wearesocial-cn.s3.cn-north-1.amazonaws.com.cn/digital2020-china.pdf>

Iman N. (2018). Is mobile payment still relevant in the fintech era?,
Electronic Commerce Research and Applications, Volume 30, 2018, Pages 72-82,
ISSN 1567-4223, Retrieved from <https://doi.org/10.1016/j.elerap.2018.05.009>.

International Monetary Fund (IMF). (2020). IMF Annual Report 2020. Retrieved from <https://www.imf.org/external/pubs/ft/ar/2020/eng/downloads/imf-annual-report-2020.pdf>

iResearch Consulting Group. (2020). China's Third-Party Mobile Payment Industry Report 2020. Retrieved from <http://report.iresearch.cn/report/202004/3552.shtml>

iResearch Consulting Group. (2021), China's Third-Party Mobile Payment Industry Report 2020 Q3 & 2020 Q4e, Retrieved from <http://report.iresearch.cn/report/202101/3726.shtml>

Jack, W., Suri, T., Townsend, R., (2010), Monetary Theory and Electronic Money: Reactions on the Kenyan Experience, *Economic Quarterly*, Vol. 96, n° 1, First Quarter, pp. 83-122.

Jack W., Adam R., and Tavneet S. (2013). Transaction Networks: Evidence from Mobile Money in Kenya. *American Economic Review*, Vol. 103, No.3, Page 356-61. DOI: 10.1257/aer.103.3.356

Japan Cashless Promotion Council, (2019), Cashless • Point return business. Retrieved from <https://cashless.go.jp/>

Kakao. (2020). Kakao March 2020 Investor relations. Retrieved from <https://t1.kakaocdn.net/kakaocorp/admin/ir/results-announcement/4586.pdf>

Kasab S. Al, Almallouhi E., Holmstedt C.A. (2020). Optimizing the Use of Teleneurology during the COVID-19 Pandemic. *Telemed. e-HEALTH*. Vol. 26, No.10, Pages 1197-1198. Retrieved from <https://doi.org/10.1089/tmj.2020.0109>

Klein A. (2019). Is China's new payment system the future? THE BROOKINGS INSTITUTION | JUNE 2019

Koch J., Rövenich K., Dunkel K., (2020), How Africa's growing mobile money market is evolving. Retrieved from https://www.ey.com/en_gl/banking-capital-markets/how-africa-s-growing-mobile-money-market-is-evolving

Kosse A., Vermeulen R. (2014). Migrants' choice of remittance channel: Do general payment habits play a role? ECB Working Paper, No. 1683, European Central Bank (ECB), Frankfurt a. M.

Llewellyn-Jones, L. (2016). Mobile Money: Part of the African Financial Inclusion Solution? *Economic Affairs*, Vol. 36, Issue 2, Pages 212-216. Retrieved from <https://doi.org/10.1111/ecaf.12177>

Ligon, E., Malick, B., Sheth, K., & Trachtman, C. (2019). What explains low adoption of digital payment technologies? Evidence from small-scale merchants in Jaipur, India. *PLoS ONE*, Vol. 14(7), 1–22. Retrieved from <https://doi.org/10.1371/journal.pone.0219450>

Maurer, B. (2012). Mobile Money: Communication, Consumption and Change in the Payments Space. *Journal of Development Studies*, Vol. 48, Issue. 5, Pages 589–604. Retrieved from <https://doi.org/10.1080/00220388.2011.621944>

Mazer, R., Rowan, P. (2016). Competition in mobile financial services: Lessons from Kenya and Tanzania¹. *The African Journal of Information and Communication*, Issue 17, 39-59. Retrieved from <https://core.ac.uk/download/pdf/188771434.pdf>

McKinsey & Co. (2020). The 2020 McKinsey Global Payments Report. Retrieved from <https://www.mckinsey.com/~/media/mckinsey/industries/financial%20services/our%20insights/accelerating%20winds%20of%20change%20in%20global%20payments/2020-mckinsey-global-payments-report-vf.pdf>

Mbiti, I., Weil, D.N., (2014), Mobile banking: the impact of M-Pesa in Kenya. National Bureau of Economic Research, NBER Working Papers: 17129.

Metzger, M., Riedler, T., & Pédussel Wu, J. (2019). Migrant remittances: Alternative money transfer channels. IPE Working Papers 127/2019, Berlin School of Economics and Law, Institute for International Political Economy (IPE).

Miao Miao, Jayakar Krishna. (2016). Mobile payments in Japan, South Korea and China: Cross-border convergence or divergence of business models?. Telecommunications Policy, Vol. 40, Issues 2–3, 2016, Pages 182-196, ISSN 0308-5961, Retrieved from <https://doi.org/10.1016/j.telpol.2015.11.011>

Ministry of industry and information technology of the People's Republic of China. (2021). "2020 Communications Industry Statistics Bulletin". Retrieved from https://www.miit.gov.cn/zwgk/zcjd/art/2021/art_4920f2ae9aef45689cfc6da92d406f9b.html

Ministry of Science, ICT and Future Planning, Korea Internet & Security Agency (MSIP and KISA). (2015). Korea Internet White Paper 2015.

Mishra V., Bisht S. S. (2013). Mobile banking in a developing economy: A customer-centric model for policy formulation. *Telecommunications Policy*, Vol. 37, Issues 6–7, 2013, Pages 503-514, ISSN 0308-5961. Retrieved from <https://doi.org/10.1016/j.telpol.2012.10.004>

Mobile Marketing Data Laboratory (MMDLabo). (2020). 最も利用しているQRコード決済サービス、トップは「PayPay」で48.7%、次いで「楽天ペイ」が15.7%、「d払い」が13.4%. Retrieved from https://mmdlabo.jp/investigation/detail_1873.html

Morawczynski O. (2009). Exploring the usage and impact of “transformational” mobile financial services: the case of M-PESA in Kenya. *Journal of Eastern African Studies*, Vol. 3, Issue 3, Pages 509-525. Retrieved from <https://doi.org/10.1080/17531050903273768>

Mordor Intelligence. (2020). Mobile Payments Market - Growth, Trends, and Forecast (2020-2025). Retrieved from <https://www.mordorintelligence.com/industry-reports/mobile-payment-market>

MTN Group. (2021). Mastercard and MTN empower millions of consumers in Africa to make payments on global platforms. <https://www.mtn.com/mastercard-and-mtn-empower-millions-of-consumers-in-africa-to-make-payments-on-global-platforms/>

National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases. (2020). How COVID-19 spreads. Retrieved from <https://www.winfocus.org/how-covid-19-spreads-article/>

Naver. (2020). 2019 NAVER Annual Report. Retrieved from https://www.navercorp.com/navercorp_/ir/annualReport/2020/NAVER_2019AR_Design_TC G0604_ENG.pdf

Ntara, C. (2015). An analysis of M-Pesa use in international transactions. *European Journal of Business and Management*, Vol. 7, No.17, Pages 73-79. DOI: 10.5120/ijca2016911020

Ondrus J., Pigneur Y. (2006). Towards a holistic analysis of mobile payments: A multiple perspectives approach. *Electronic Commerce Research and Applications*, Vol. 5, Issue 3, 2006, Pages 246-257, ISSN 1567-4223. Retrieved from <https://doi.org/10.1016/j.elerap.2005.09.003>.

Pacifici G., Pozzi P. (2004). *Money-on-line.eu: Digital Payment Systems and Smart Cards*. FrancoAngeli.

People's Bank of China. (2020). The People's Bank of China Overall Operation of the Payment System in 2019. Retrieved from http://www.gov.cn/xinwen/2020-03/17/content_5492272.htm

People's Bank of China. (2021). The 2020 overall operation of the national payment system. Retrieved from <http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/4213347/2021032414491874847.pdf>

Pradhan R.P., Mallik G., Bagchi T.P. (2018). Information communication technology (ICT) infrastructure and economic growth: a causality evinced by cross-country panel data. IIMB

Management Review. Volume 30, Issue 1, Pages 91-103. Retrieved from <https://doi.org/10.1016/j.iimb.2018.01.001>.

Puriwat W., Tripopsakul S. (2021). Explaining an Adoption and Continuance Intention to Use Contactless Payment Technologies: During the COVID-19 Pandemic. *Emerging Science Journal*, Vol. 5, No. 1, February, 2021, Pages 85-95. Doi: 10.28991/esj-2021-01260

PYMNTS. (2020). Bain Capital Technology's Bet On hey And Japan's Digital Payments Shift. Retrieved from <https://www.pymnts.com/digital-payments/2020/bain-capital-tech-japan-as-the-land-of-the-rising-digital-payment/>

Rahul D., Neena P., Abhipsa P. (2020). Impact of digital surge during Covid-19 pandemic: A viewpoint on research and practice. *International Journal of Information Management*, Volume 55, 2020, 102171, ISSN 0268-4012, Retrieved from <https://doi.org/10.1016/j.ijinfomgt.2020.102171>.

Rakuten Today. (2019). Building Japan's cashless future: Koichi Nakamura. Retrieved from <https://rakuten.today/tech-innovation/japan-cashless-future.html>

Ramanzan E. (2021). The Impact on Digitalization on Financial Sector Performance. In Sezer Bozkuş Kahyaoğlu (Eds.), *The Impact of Artificial Intelligence on Governance, Economics and Finance*, Page 99-120, Springer Singapore. https://doi.org/10.1007/978-981-33-6811-8_6

Rapyd. (2020). Asia Pacific eCommerce and Payments Guide 2020, Retrieved from <https://cdn2.hubspot.net/hubfs/5246303/Asia%20Pacific%20eCommerce%20and%20Payments%20Guide%202020.pdf>

Ren T., Tang Y. (2020). Accelerate the Promotion of Mobile Payments during the COVID-19 Epidemic. *The Innovation*, Vol. 1, Issue 2, 2020, 00039, ISSN 2666-6758. Retrieved from <https://doi.org/10.1016/j.xinn.2020.100039>.

Samantha M.K. (2020). Dirty money: The case against using cash during the coronavirus outbreak, CNN, Retrieved from <https://www.cnn.com/2020/03/07/tech/mobile-payments-coronavirus/index.html>

Setor T.K. , Senyo P.K., Addo A. (2021). Do Digital Payment Transactions Reduce Corruption? Evidence from Developing Countries, *Telematics and Informatics*, Vol. 60, 2021, 101577, ISSN 0736-5853, Retrieved from <https://doi.org/10.1016/j.tele.2021.101577>

Singh N.K., Sahu G.P., Rana N.P., Patil P.P., Gupta B. (2019). Critical Success Factors of the Digital Payment Infrastructure for Developing Economies. In: Elbanna A., Dwivedi Y., Bunker D., Wastell D. (eds) *Smart Working, Living and Organising*. TDIT 2018. IFIP Advances in Information and Communication Technology, Vol 533. Springer, Cham. Retrieved from https://doi.org/10.1007/978-3-030-04315-5_9

SoftBank. (2018). SoftBank and Yahoo Japan JV to Launch "PayPay," Barcode-Based Smartphone Payment Services in Collaboration with India's Paytm in the fall. Retrieved from https://www.softbank.jp/en/corp/news/press/sbkk/2018/20180727_01/

South China Morning Post. (2021). Japan's digital payments rise as people avoid touching cash amid coronavirus pandemic. Retrieved from <https://www.scmp.com/news/asia/east-asia/article/3122319/japans-digital-payments-rise-people-avoid-touching-cash-amid>

Statista. (2021). Most popular e-payment services used among respondents in South Korea 2020. Retrieved from <https://www.statista.com/statistics/1106308/south-korea-leading-e-payment-services/>

Staykova, K. S., & Damsgaard, J. (2015). The race to dominate the mobile payments platform: Entry and expansion strategies. *Electronic Commerce Research and Applications*, Vol. 14, No. 5, Pages 319–330. Retrieved from <https://doi.org/10.1016/j.elerap.2015.03.004>

Steven M. (2017). WeChat sees bigger spenders as China goes cashless. *Tech in Asia*, April 24, 2017, Retrieved from <https://www.techinasia.com/wechat-cashless-china-data>.

Summers B.J. (1994). *Banking and the Payment System. In The Payment System. Design, Management, and Supervision*. International Monetary Fund. Retrieved from <https://doi.org/10.5089/9781557753861.071>

Tangit T.M., Law R. (2021) Mobile Payments, Chinese Tourists, and Host Residents: Are Destination Stakeholders Prepared to Facilitate Mobile Payments? In: Wörndl W., Koo C., Stienmetz J.L. (eds) *Information and Communication Technologies in Tourism 2021*. Springer, Cham. Retrieved from https://doi.org/10.1007/978-3-030-65785-7_18

Telecommunications Carriers Association. (2020). Number of subscribers by Carriers 2020, Retrieved from <https://www.tca.or.jp/english/database/>

Téllez J., Zeadally S. (2017). Mobile Payment Systems: Secure Network Architectures and Protocols. Springer.

Tencent. (2021). Tencent 2020 Fourth Quarter and Annual Results Announcement. Retrieved from <https://static.www.tencent.com/uploads/2021/03/24/b02a6670e499fa9b1fac9a3e09753de7.pdf>

The Economist (2020), The covid-19 crisis is boosting mobile money, May 30th, Retrieved from <https://www.economist.com/middle-east-and-africa/2020/05/28/the-covid-19-crisis-is-boosting-mobile-money>

Tiago O., Manoj T., Goncalo B., Filipe C., (2016). Mobile payment: Understanding the determinants of customer adoption and intention to recommend the technology, Computers in Human Behavior, Volume 61, 2016, Pages 404-414, ISSN 0747-5632, Retrieved from <https://doi.org/10.1016/j.chb.2016.03.030>.

Torre D., Xu Q. (2019). La Chine aux avant-postes de la digitalisation des paiements. Revue d'économie financière, 2019/3 (N° 135), Pages 99-114.

Torre D., Xu Q. (2020). Digital payment in China: adoption and interactions among applications. *Revue d'Economie Industrielle*. No 172, 4^e Trimestre 2020, Pages 55-82.
Retrieved from <https://doi.org/10.4000/rei.9471>

Waverman L., Meloria M., Melvyn F. (2005). The impact of telecoms on economic growth in developing countries. *The Vodafone Policy Paper Series* 3(2): Page 10–23.

World Health Organization (WHO). (2021). WHO Coronavirus (COVID-19) Dashboard.
Retrieved from <https://covid19.who.int/>

World Travel & Tourism council. (2019). MOBILE PAYMENTS IN TRAVEL & TOURISM: UNLOCKING THE POTENTIAL.
https://wttc.org/Portals/0/Documents/Reports/2019/Security_and_Travel_Facilitation_Seamless_Travel_Journey_Mobile_Payments_in_Travel_and_Tourism_Mar_2019.pdf?ver=2021-02-25-182803-757

Wu R.-Z., Lee J.H., Tian X.F., (2021). Determinants of the Intention to Use Cross-Border Mobile Payments in Korea among Chinese Tourists: An Integrated Perspective of UTAUT2 with TTF and ITM. *J. Theor. Appl. Electron. Commer. Res.* 16, no. 5: 1537-1556.
<https://doi.org/10.3390/jtaer16050086>

Yan L. Y., Tan G.W. H., Loh X. M., Hew J. J., Ooi K. B.. (2021). QR code and mobile payment: The disruptive forces in retail. *Journal of Retailing and Consumer Services*, Vol. 58, 2021, 102300, ISSN 0969-6989. Retrieved from
<https://doi.org/10.1016/j.jretconser.2020.102300>.

Yano Research Institute. (2018). Survey on mobile payment market. Retrieved from https://www.yano.co.jp/press-release/show/press_id/2031

Yiping H., Xue W. and Xun W, (2020), Mobile Payment in China: Practice and Its Effects, *Asian Economic Papers*, Vol. 19, Issue 3, Pages 1–18. Retrieved from https://doi.org/10.1162/asep_a_00779

Zhao X. and Sun Y. (2012). A Study of Third-party Online Payment: Risk Control and Supervision Analysis. Eleventh Wuhan International Conference on e-Business 95.

Zhao Y. and Bacao F. (2021). How Does the Pandemic Facilitate Mobile Payment? An Investigation on Users' Perspective under the COVID-19 Pandemic. *Int. J. Environ. Res. Public Health* 2021, Vol. 18, Issue 3: 1016. Retrieved from <https://doi.org/10.3390/ijerph18031016>

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