LUISS

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Chair of *Money and Banking*

Mobile Payment Systems and Financial Inclusion: the case of M-Pesa

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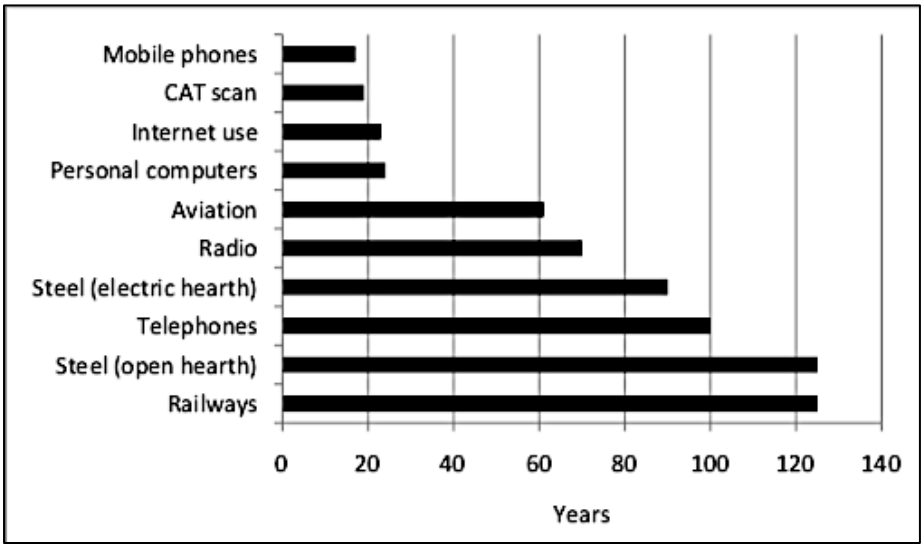
The adoption of mobile phones has occurred at the fastest rate and to the deepest level of any consumer-level technology in history. It has been one of the innovations that changed most the world and the global economy. As the costs of mobile phones have fallen, now most of the people can afford to buy one, and as the penetration of the product has radically increased in all the world, as shown in Figure 1, mobile payment systems have begun to spread across emerging countries.

Figure 1: Technology adoption for selected innovations



Source: World Bank

In 2018, 70% of the world population had internet access, and 80% has a mobile phone (Statista.com).

Mobile banking services have radically changed the type of money people use, going from cash to electronic money, which is described as " an electronic store of monetary value on a technical device that may be widely used for making payments to undertakings other than the issuer without necessarily involving bank accounts in the transactions, acting as a prepaid bearer instrument" (Investopedia.com).

These new technologies in the financial sector have made it possible for financial services and products to be more accessible at cheaper costs, have made payments more efficient and less time-consuming.

The main driver in developing countries for these innovations is the concept of financial inclusion, which means that individuals have access to financial products and services.

The targets are mostly people who don't have the possibility to access basic financial services, the so-called financially excluded individuals, either because they cannot afford the required minimum deposits that banks ask for, or because they are geographically unable to access a bank branch to subscribe for a bank account.

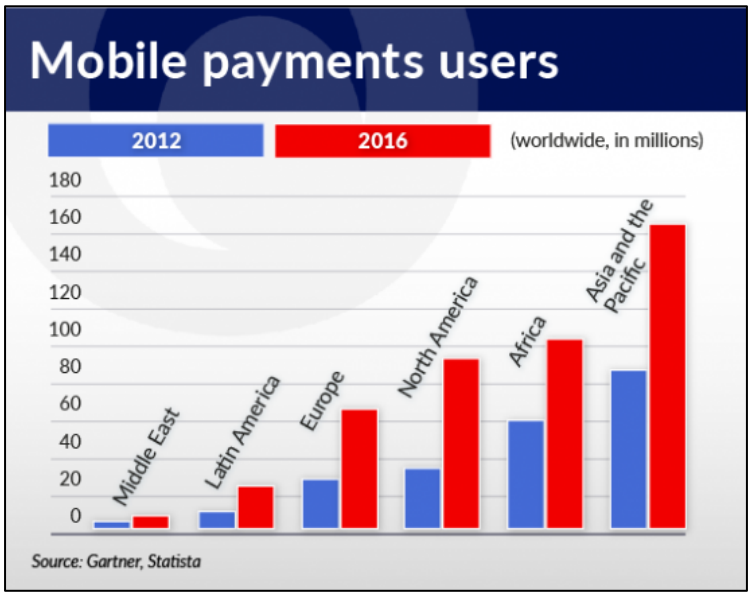
To reach the goal of financial inclusion, the interoperability of different sectors is mandatory so that data can be shared which will help to build a meaningful digital platform.

Mobile phone innovations are leading to mass changes in the financial sector, which has old and dominant players that control the market and was seen as a sector impossible of changing in the direction of helping the poorest of the poor with new services, like mobile payment systems.

Imagine then what these innovations can do in more competitive markets, like health and agribusiness, and how they can change these markets to approach poor people and how more efficient they can become.

Worldwide mobile payment systems market is expected to surpass $1 trillion by the end of the year, compared with a value of the market of just $450 billions in 2015.

Figure 2: Mobile payment users



Source: Gartner, Statista.com

Western countries (especially the United States of America and Europe) are just becoming familiar with mobile payment systems, while countries in developing countries have established this innovation in their everyday-life for more than ten years. As shown in Figure 2, both North America and Europe are behind Africa and Asia in number of users with a mobile payment account.

In the USA and EU, we have seen very big corporations fighting to have control of this market. The first product is Apple Pay, an Apple product which can be used only by users of their mobile phones. It is a digital wallet service that can be used to purchase goods and services in stores, online, and in apps. According to Statista.com, Apple Pay has 383 million users worldwide.

It is possible to use Apple Pay to send money "Person to Person", using Apple message app. It is a secure service because it uses the Face or Touch ID, and it is convenient because you can pay for everything just by using your smartphone even without the need to have an internet connection. It is also easy to use: all Apple users have the "Wallet" app already installed on their device; then, you only have to add your credit or debit card information and you can start using Apple Pay. Furthermore, Apple has just presented the "Apple Card" in collaboration with Goldman Sachs, which will be released to the public in the US this summer. It is a credit card and according to Apple, "It represents all the things Apple stands for: simplicity, transparency, and privacy". It is designed to work with Apple Pay, but customers will also have a physical card they can use. It won't have any fee for customers, and it will probably have low-interest rates to pay down the balance. It will also push people to use its e-Wallet because Apple promised a 2% cash-back for every contactless transaction.

Then there is PayPal, which in the EU is still limited to P2P transactions and purchase of goods via the Internet, rather than the payment of goods and services in store. PayPal is one of the first innovations in the mobile payment industry, as it was founded in 1999 by Elon Musk and Peter Thiel. In 2002 eBay purchased PayPal, but in 2015 eBay decided to make the payment platform an independent entity.

PayPal's core service is to allow users to make online payments without having to share his credit card's information to another third-party. While the idea was first to increase the privacy and security of customers because the Internet was a very new innovation and not so many people were willing to share sensitive personal info due to a lack of trust, now it is especially to make payments faster and easier by avoiding users to enter personal info but by only having to access to their personal PayPal account.

PayPal has added a wide range of services, proving to be one of the most innovative companies in the mobile payment market. One of their main features is the possibility to send money person-to-person. PayPal provides instant transfer of funds from one PayPal account to another, most of the time without any fee for customers. It is very convenient because it is immediate and it is very useful for example for emergencies, and any situations where somebody away from his family has an urgent need for money.

Another service that they recently added and that is very popular especially for young people, is the Money Box service. It is a product that offers a convenient and fast method to collect money for a mutual fund or for a collection. Furthermore, it can also be used to buy in-store goods, from presents to shared expenditures for the house. Money Box is free to open, but all the people involved need a PayPal account, and the money received in the Money Box is for personal payments only, as they can be received only from family and friends.
According to Statista.com, PayPal made almost $16 billion in 2018, most of them coming from transaction fees, and it processed a total volume of transactions of $ 578 billion, $227 billions of them being transferred via mobile phone. PayPal has 277 million active registered users and it accounted for 22% of online transactions in the US in 2018.
PayPal's fees are charged only for some types of transactions, such as cross-border person-to-person transactions, and revenues from selling goods on sites like eBay if you choose PayPal as the payment platform. Furthermore, sending money to family and friends, withdraws, deposits, and the payment for goods and services are free if the customer uses its PayPal balance or their bank account.

Another big player's mobile payment system is Alipay, which is the world's most extensive system with more than 1 billion customers worldwide (Alipay.com). It has been created by the Alibaba Group and the founder Jack Ma in 2004, and it is an online payment platform. It controls more than 55% of the Chinese payment market (Statista.com), which is the largest market in value worldwide. Alipay's competitor in China is TenPay, which has a 40% share of the market. Alipay provides a 100% reimbursement for all transactions that were not authorized by the user, with a limit of 90 days payment protection. Customers can create an account very easily and the process is fast and secure. Signing in only requires the user to give his general information and a credit/debit card info which will be used to make payments.
Alipay's core service is very similar to the one of PayPal: to be a third party between buyers and sellers in online transactions to enhance trust between them. Alipay holds the buyer's money until the seller has delivered the product and meet the buyer's requirements. Then, it transfers the money to the seller, ending the transaction.
The other main service provided by Alipay is the purchase of goods and services in-store. Using the mobile app, the customer has a unique QR code connected to its account that has to show to the cashier in order to pay. The scanning takes a few seconds, and then the customer has to approve the transaction via the app. This service provides a quick and safe mode to pay without having to carry cash or having to pull out your wallet or credit/debit cards.
Another service provided by Alipay is the person-to-person payment: users can transfer money to any Alipay customer, which can be a friend or part of the family, but it can also be a taxi

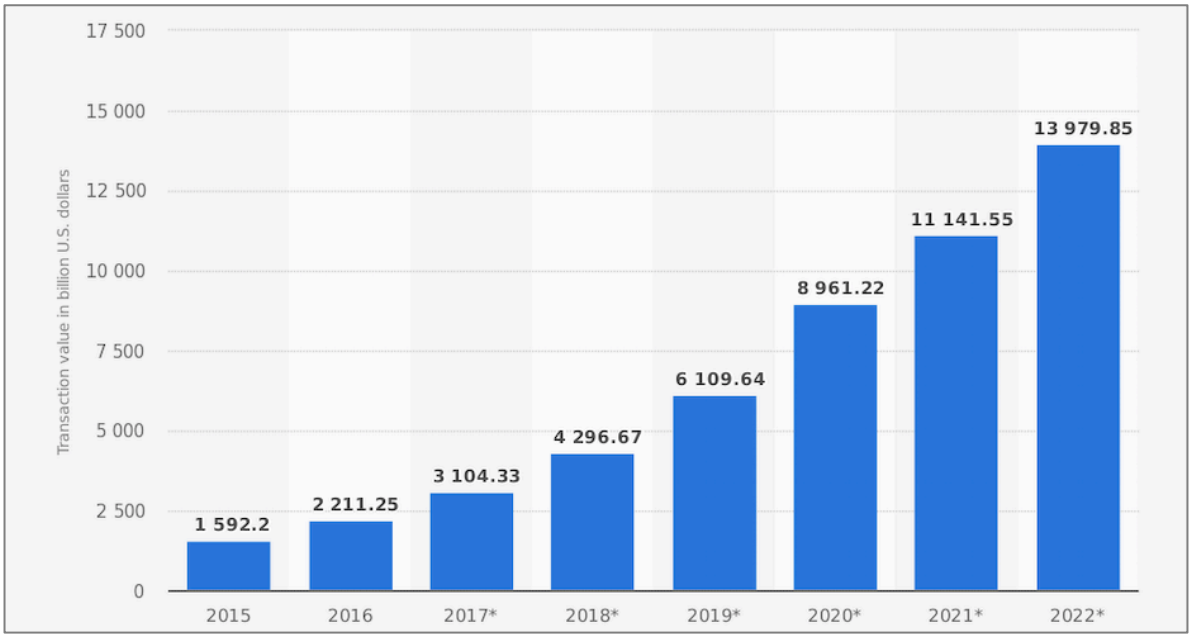
driver, and you transfer money to pay for the ride. When it comes to paying for services, the seller must show its personal QR code to the buyer in order to receive the payment correctly. It is instantaneous and both the seller and the buyer receive a message that proves that the transaction happened correctly.

Furthermore, Google Pay gives you the possibility to pay in hundreds of apps without having to enter your payment information.

Additionally, social media platforms, like Instagram and Snapchat, are creating naïve payments and checkout features in-app, and there is Facebook Payment, which can be used for P2P transactions via its Messenger app.

All these services couldn't work in developing countries, as people, in order to use them, must have a smartphone and an internet connection, two features that don't have a high penetration in most of the developing countries.

Figure 3 Annual transaction value of mobile payment technology market worldwide



Source: Statista.com

According to The Economist, mobile banking payments in Asia are used by more than 1 billion people, while in the United States, 49% of people with a bank account use their mobile phone to make payments.

As it is shown in Figure 3, the worldwide mobile payments market has grown dramatically, and its future projections show an even greater growth. As of today, the world payment system

market is worth almost $2 trillion, while the mobile payment system market is worth more than $1 trillion. As shown in Figure 3, more than $4 trillion, equal to Germany GDP, are processed via mobile payment systems every year, and the projections show how this value will drastically increase, with a projection of $14 trillion, the equivalent of the second worldwide country's GDP, China.

So, mobile payment system innovations have a great effect on the global economy, because they have made payments, especially online ones, safer and faster. These innovations also drove costs for customers down, thanks to the digitalization of the services that reduce the fixed costs of the company.

All these systems are present in developed countries, so they increased the safety and the convenience of the transactions, without really having a major impact on people's lives relative to their income and consumption; they just proposed another less expensive approach for people to spend money on goods and services and a faster way to send money person-to-person. Without these innovations, people would still perform all those transactions, just in a relatively less efficient method.

There are examples of mobile payment systems, especially in developing countries, that completely changed people's lives, by giving them the possibility for the first time to have access to basic financial services, like an e-wallet and bank accounts. This concept is summarized in the one of financial inclusion, which is essential in order to allow people to live below the poverty line. The most successful innovation in the mobile payment industry is undoubtedly M-Pesa, launched for the first time in Kenya and then spread across the African continent and beyond.

CHAPTER 1: GENERAL INTRODUCTION

1.1 M-Pesa: Overview

M-Pesa, launched in March 2007 in Kenya, is an electronic payment and store of value system operated by Kenyan largest cellular phone provider, Safaricom, which is owned by the Vodafone group. It has been initially introduced as an alternative way for the unbanked population of the country to have access to financial services.

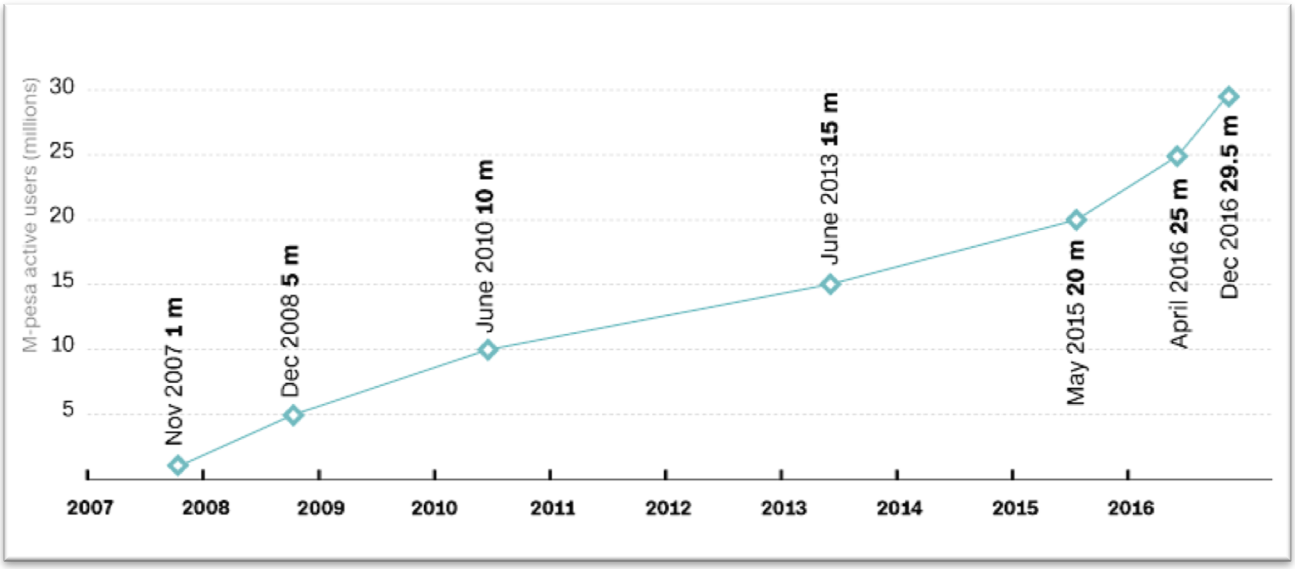
M-Pesa is a blend of two words where M stands for "mobile" and Pesa means "money" in the Swahili language. The service is active in Kenya, Tanzania, Mozambique, Afghanistan, Ghana, Egypt, India, Lesotho, and the Democratic Republic of Congo.

The service runs on the "mobile remote payment" innovation, which uses the SMS technology instead of being dependent from an internet connection. M-Pesa works through this technology for different reasons: first, Kenya had a shallow penetration of both smartphones and internet connection back in 2007. Then, SMS technology is easier to understand for the unbanked and/or illiterate M-Pesa users, which are the segment of the population targeted by the payment system. Lastly, a "mobile proximity payment", which is the technology that needs an internet connection, doesn't work for long distance payments, so that it wouldn't enable for remittance, one of the central cores of M-Pesa.

Additionally, the M-Pesa e-wallet is contained in the SIM card of the mobile phones. Vodacom decided to use SIMEX cards, which are SIM cards without associated a phone number; thanks to SIMEX cards, agents allow customers to replace their existing SIM card without having to change their old phone number. This feature helped encouraging first clients to change their SIM and to open an M-Pesa account.

Moreover, M-Pesa has accomplished to become a mobile phone operating network that creates an effective mobile financial system by fundamentally changing the existing money system. The service has become one of the most successful mobile phone-based service in the developing world that has drastically altered both the financial and telecommunications sectors in emerging countries. It made it possible for the poor and unbanked people to send money person-to-person and have easier access to cash, at a lower cost and less time.

Figure 4: M-Pesa Active Users



Source Safaricom Annual Report 2017

Within eight months since inception, as it can be seen in Figure 4, more than 1.1 million people in Kenya had registered to use M-Pesa, and over US$ 87 million had been transferred over the system. The explosive growth was also mirrored in the growth of M-Pesa agents, which grew to over 18000 locations by April 2010, from a base of 450 in 2007 (Safaricom Annual Report 2013).

The Safaricom Annual Report of 2019 shows that M-Pesa has more than 28 million active customers in Kenya only, with a total of almost 32 million active users worldwide. M-Pesa achieved KSH 75 billion of revenue in the last Kenyan fiscal year, which is almost 40% of the total revenues of Safaricom. Furthermore, M-Pesa has created almost 1 million direct and indirect jobs and supplied water to more than 20000 people. The capacity of M-Pesa has been upgraded to 1200 transactions per second, and the number of active users has increased by 10% YoY.

M-Pesa has started to "de-materialize" cash into e-float, which provides multiple benefits in terms of safety (reduced risk of theft or loss), convenience (physically holding cash is costly, more comfortable to send money remotely, lower transport costs) and privacy.

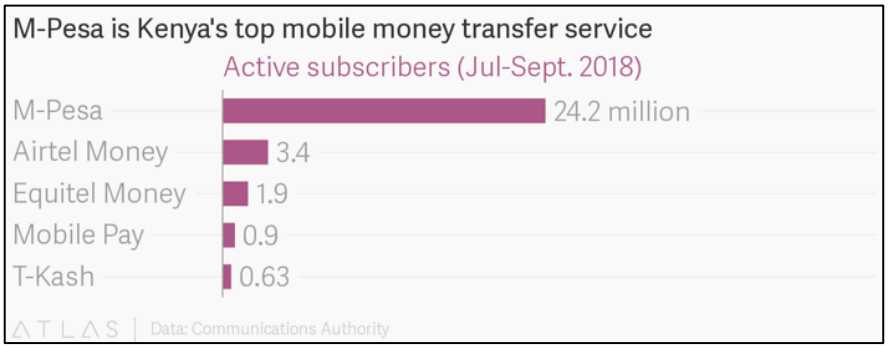
It is described as one of the most important innovations in developing countries, and as the world's game changer in mobile money transfers. It represents the gold standard for innovative financial services, as it has created an environment where even the poorest of a remote African village can become "financially included".

"M-Pesa has increased the efficiency of the allocation of consumption over time while allowing a more efficient allocation of labor, resulting in a meaningful reduction of poverty in Kenya" (Suri and Jack 2016). This describes how M-Pesa positively affected the everyday lives of all citizens, making basic financial transactions possible and efficient. M-Pesa has essentially made life much easier for its customers, in fact, as the Economist says, it is now easier to pay for a taxi ride using the phone in Nairobi than it is in New York.

According to the 2014 Suri and Jack research, M-Pesa has radically changed productivity in Kenya: now people can spend less time and less money to perform the same activities they were used to do, and the effects of the increased productivity have been significant, in fact, evidence shows a household income increase between 5 and 30%.

As the head responsible of M-Pesa since the beginning, Nick Hughes describes why he thinks M-Pesa is having a remarkable impact in the macroeconomy and the money supply of Kenya: *"The biggest impact is that M-PESA increases the velocity of money! The ability to transfer relatively small amounts of money quickly across long distances has a huge impact, and this is magnified many times in markets with limited infrastructure. That uptake and usage is the clearest indicator of how relevant, important and beneficial this is to Kenyans. M-PESA is a great example of leapfrog innovation. In the western world, we live with over-engineered legacy systems as a result of layered incremental growth, not only financial services but also the delivery of other fundamental services such as power and clean water. If we had a blank sheet of paper to start again, we would design things very differently – and that is exactly what we did with M-Pesa".*

Figure 5 M-Pesa and its competitors in Kenya



Source: Communications Authority of Kenya

As Figure 5 shows, M-Pesa has a very high share of the money transfer market, with more than a 78% share of the Kenyan market.

Furthermore, M-Pesa has facilitated the safe storage and transfer of money: it makes it easier and faster for customers to pay for, and to receive payment for, goods and services. Today, bills can be paid electronically with a mobile phone instead of traveling to an often distant office with cash and waiting in a long queue; customers can quickly buy airtime from their phone, and workers like taxi drivers can now operate more safely without having to transport large amounts of cash, because they can be paid electronically now.

1.2 Services, registration process, and fees

M-Pesa enables users to perform 3 basic transaction: it allows users to exchange cash for "e-float" (called a "cash-in" transaction), to exchange e-float back into cash ("a cash-out" transaction), and to send e-float to other phone users using SMS technology (called person-to-person or P2P transaction). This last transaction type is also called "transfer function", and today it is used mainly for remittance, but now it is also used to pay for goods and services, from electricity bills to school fees.

To perform a cash-in or cash-out transaction, a customer has to visit one of Safaricom's thousands of agents, which are money retailers that exchange cash for e-money and vice-versa, and pay a fee, which varies depending on the quantity of money involved in the transaction.

M-Pesa is also a micro-financing and money transfer services, which are intended to allow customers to access basic banking features via mobile phones rather than via a bank.

M-Pesa offers access to loans, salary and bill payments, effectively offering a banking system for the unbanked. This is very important because in 2013, 80% of Kenya's population didn't have access to the traditional banking system, so technically most of the population were financially excluded. While now, thanks to M-Pesa, just over 15% of Kenya's adult population is financially excluded (Statista.com).

Finally, Safaricom has started an M-Pesa feature which enables institutional payments, allowing companies to pay salaries and collect bill payments.

Additionally, M-Pesa offers mobile banking features, one of them being M-SHWARI, a financial service that includes an interest-paying bank account at CBA bank.

M-Pesa sends a receipt to customers as a proof of transaction. Furthermore, in order for a transaction to happen, both users have to know each other's phone numbers. This is crucial because M-Pesa uses phone numbers as account numbers. When the transaction ends, both parties receive an SMS notification with the name of the receiver and the amount deposited to or withdrawn from the user's account. The receipt, which is received within seconds, has always been used by Safaricom to promote transparency for all individuals involved in a transaction.

The process for customer registration is quick, simple and it can be done in any M-Pesa retail outlet. Customers don't pay any fee to register and the agents are responsible for most of the paperwork. The customer must have a national ID and general info. If the customer's SIM is not preloaded with the M-Pesa application, the outlet replaces it for free with one that works with the service. Then, customers are asked to input a 4-digit PIN of their choice. In addition, agents can explain to customers how to use the application and the tariffs associated with each service. Such agent support is vital especially in rural areas, where potential users can be illiterate or unfamiliar with the functioning of their phone. There is no initial minimum balance requirement, and customers can deposit money for free, so there is no immediate barrier to start using the service. This is another crucial step to customer loyalty and trust.

Figure 6: Tariffs in Ksh

M-PESA Tariff

Transaction type	Transaction range (KShs)		Customer Charge (KShs)
	Minimum	Maximum	
Value Movement Transactions			
Deposit Cash	100	35,000	0
Send money to a registered M-PESA user	100	35,000	30
Send money to a non-registered M-PESA user	100	2,500	75
	2,501	5,000	100
	5,001	10,000	175
	10,001	20,000	350
	20,001	35,000	400
Withdraw cash by a registered M-PESA user at an M-PESA Agent outlet	100	2,500	25
	2,501	5,000	45
	5,001	10,000	75
	10,001	20,000	145
	20,001	35,000	170

Source: Vodafone, Safaricom

M-PESA tariffs are transparent and unsurprising for all users. This has enabled a faster growth of trust from users, which can understand easily how much they are going to be charged for every transaction. Every transaction is followed by an SMS which describes all the info of the transaction, and there are no charges to customers for the SMSs that delivers the service. All the fees paid by customers are subtracted directly from the user's account, and agents cannot charge any direct fees.

Consequently, agents collect the commissions from Safaricom rather than from customers; this reduces the potential for agent abuses and frauds. Fees are uniform nationwide, and they are always posted outside all outlet locations. Fees are expressed as an absolute value, as shown in

Figure 6, rather than a percentage of the value of the transaction; this makes it easier for users to fully understand the actual cost of each transaction and also helps them compare the cost of the transaction relative to the alternative and usually costlier money-transfer services.

1.3 Agents and Super agents

M-Pesa relies on its network of agents, which are retail outlets that act as mobile money retailers, where consumers can deposit cash into or withdraw cash from "e-wallets" on their phones. Agents are seen as "Human ATM" because liquidity is managed almost exclusively by them.

In roughly four years, Safaricom has provided its customers with some 30'000 M-Pesa agents and now has more than 300'000 all across Kenya only (Safaricom Annual Report 2019).

Agents played a primary role in the early development of M-Pesa by creating trust between the new payment system and the population of Kenya. Without trust, people would have never started to conduct cash-in/ cash-out transactions; they had first to know if their money were safe. Agents presiding over the stores are the cornerstone of the operation: the more a customer feels comfortable making transactions with an agent, the more likely they are to increase the use of M-Pesa.

The presence of a person who personally records every transaction, instead of a machine, assuaged many of the fears that customers had about the security of their money. The expanding network of agents proved to be cost-effective and created a friendly, familiar face for confused customers.

So, the value agents add is trust, especially crucial in Kenya given that many of the customers have never used a financial product before. Many users who have never used bank accounts clearly felt more comfortable running a financial transaction in a petrol station or a mini market rather than in a bank; and they feel freer discussing finance with an M-PESA agent rather than with bankers, hidden behind glass and iron grills.

Safaricom, understanding its crucial role, employed multiple measures to ensure trust from customers. Firstly, it closely linked the M-Pesa brand with the Safaricom one: being a mobile firm in Kenya with a dominant share of the market (over 80% at the M-Pesa launch and more than 65% today), Safaricom was already a broadly respected and trusted brand by many customers.

Secondly, Safaricom guaranteed that customers could walk into any agent's outlet and have a positive experience. This also has helped to build the trust in the outlets that M-Pesa needed to succeed and it still gives customers a consistently positive view of the service.
Safaricom keeps the customer experience activity under control by investing in in-store training and on-site supervision. Safaricom has chosen to give the responsibility of these functions to one third-party vendor, which is Top Image, a firm specialized in Below the Line (BTL) Marketing.
Thirdly, customers receive instant SMS confirmation and description of their transaction, helping customers learn by experience to trust the system. The description of the transaction is formed by general information of the receiver and the amount transferred. This allows the sender to confirm immediately that he sent the money to the right person. This is a very important feature, as sending money to the wrong person is the most common source of error.
Finally, Safaricom requires its outlets to record all cash-in/cash-out transactions in a paper-based, Safaricom-branded logbook, to ensure that if they have problems with their servers, Safaricom still has a record of all the transactions in cases of disputes.
Then, users are required to sign the log for every transaction they perform, which discourages fraud and also gives agents the possibility to sell customer care for customers. Of course, all information of the transactions is contained in the agent log, which is controlled electronically by Safaricom. Therefore, the primary purpose of the agent log is not for recordkeeping, but to provide comfort to users who have always seen transactions recorded on paper, and to increase trust in the system.

The new mobile payment system has enabled and increased entrepreneurship: people saw an opportunity to expand their business or even start now by becoming M-Pesa agents. These agents, which in most cases already had a store, which could be a gas station, a mini market or any corner shop, have to apply and attend a training to have the license from Safaricom. After that, they have to start proving e-money or cash with their own money, which is the only barrier to entry into this business. When M-Pesa users so to an outlet to exchange money, they are doing so directly with the agents' money. M-Pesa has had no problem at all to expand its network of agents because the business can be highly profitable relative to the other opportunities they have in Kenya.
In fact, M-Pesa agents make a profit from commissions; they make a small profit for every transaction they perform that requires the customer to pay a fee, which are cash-in and cash-out transactions (withdraw and deposit). The higher the volume of transactions an agent performs, the higher the profit he/she makes.

M-PESA agents earn on average $5 a day, which, in Kenya, is higher than the average daily income. Owners of agencies make far more. Moreover, aggregators, which are people who own or manage multiple outlets, can make between 1,000 or 2,000 US dollars a month, which is more than the average annual per capita GDP in Kenya. Furthermore, because agents can sell other items other than e-money and cash, which can be oil in case of a petrol station, or house products and food in case of a mini market, or in general air time, they sell more goods given the increase in the volume of people coming into their outlets.

On the other hand, there is a different type of agent, the super-agent.
Super Agents perform purely as an agent for agents: they are bank branches that provide e-float and liquidity to all M-Pesa agents.
The M-PESA agent can buy e-float from a super-agent and sell it as he or she would sell any other commodity item, with the exception that the commodity traded is e-money. Naturally, it can happen the opposite, where agents need cash and they trade it with e-money with a Super-agent.
The agent needs to trade with a super-agent when, for example, the cash stock of e-float of the agent is too low, and the stock of cash increases so much that at a certain point the agent needs more e-float; thus, he takes his cash to the super-agent to rebalance his "store to ensure an equilibrium between the supply of cash and e-float.
The main obstacles for an agent to rebalance its supplies are time and money. Both functions o depend on how far the outlet is from the closest super-agent. Security, of course, is also a factor, as the agent is either carrying a large sum of cash to or from the bank, usually on a well-traveled street, at least once a day, often more, depending on the volume of transactions.
Super-agents are fundamental for agents: for example, in rural areas, people perform more cash-out transactions, so the agents in that area need liquidity ready. Thanks to super-agents, which provide them the cash needed, agents can perform all the transactions asked by customers. Safaricom helped the agents' work by signing multiple agreements with different banks so that the density of super-agents would be higher, giving a higher probability that an agent has a super-agent close to its outlet, which decreases the time spent by the agent and the risk of losing the cash.

With the big hitters coming on board, a new financial ecosystem was taking shape. Banks that had tried to shut down M-PESA and painted them as a competitor with unfair advantages, were taking advantage of M-PESA's huge customer base and monetary flows to increase their own business and transaction fees. Super agents were sitting on piles of cash, mirroring e-float in

the system. At the same time, they were helping agents rebalance more quickly and provide cash and e-float on demand—for a transaction fee.

1.4 Why M-Pesa has been created

One of the factors that made possible the success of M-Pesa was the cultural background of Kenya: poor people move from small rural villages to cities, in order to get a job and seek a better life. However, those people maintain a close relationship with their families in the villages and are expected to help the community economically. In fact, in Kenya, migrants are tied with their rural homes by an ethnic and cultural conception of citizenship. Prior to M-Pesa introduction, Kenyans used either an informal or a formal channel to transfer money. For example, bus companies offered formal money transfer services, where receivers would collect the money sent at the bus terminal in their village, in there was one. The post office also offered a variety of different money transfer products. Finally, banks and money transfer companies such as Western Union also offered transfer services. However, those services had in common that they were extremely inefficient: they were costly, asking very high fees, not secure, because there was a high probability of your money to be stolen or lost, and their outlet and branch networks were not widespread, so people from small villages in rural areas had to spend hours to arrive at the "terminal".

Thanks to M-Pesa, it's now far more comfortable to send money P2P in Nairobi than in any other city in the developed countries. In fact, eight out of ten people in the world who sends money over a mobile phone lives in Kenya.

M-Pesa's success shows there was a strong latent demand for domestic remittances. M-Pesa introduces an increase in the efficiency of transactions that were already occurring. People who live in cities can now send money home in a less-costly and more secure way: money is sent electronically in a couple of minutes, and thank the extensive network of agents, families can withdraw money directly in their village. So, sending money to relatives by M-PESA saves time (often days) and is much safer than carrying large amounts of cash.

1.5 M-Pesa's Team

In 2003, Nick Hughes had the idea of creating a mobile money transfer product in Kenya.

Hughes, who was then Head of Social Enterprises at Vodafone in England, had become conscious of a promising and profitable approach to sustainable development: just as access to

communications facilitates entrepreneurial activities, so does access to finance. This access has the potential to increase financial inclusion, bringing the creation of wealth through bottom-up economic activity, job creation, and financial trade.

The main object of the idea was to get cash into the hands of poor people who can use it. This concept was limited on the supply side rather than on demand. This means that people were not receiving money because of a shortage of funds, but because there wasn't an efficient product to move money from the sender to the receiver.

Since the creation of money, the ability to move it from point X to Y has been a central basis of all economic activities. Indeed, since the launch of M-PESA, a huge flow of money has moved electronically via the service.

Hughes' 2003 project to use mobile-based technology to deliver financial services, particularly microfinance loans, was awarded 1 million pounds by the UK Department of International Development (DFID). Vodafone received the funds by promising to invest the same amount of money in the project and create a team to work on it. Hughes created a very small team and then organized a series of open workshops in Nairobi and Dar es Salaam (Tanzania), inviting banks, microfinance organizations, technology service suppliers, NGOs with interest in micro-credit, and telecom and banking regulators. From these workshops, Hughes and its team understood that they had to overcome two main problems: the first is to improve internal management processes, which could allow firms to increase the efficiency of the products; secondly, they had to make sure to create a very simple product to allow customer could have an easy access to monetary and financial services.

Focusing on the second problem, Hughes started to design and test a platform that could allow customers to manage microfinance loans using only their mobile phone. They wanted to create a platform that could create an easy product for microfinance, making it easy as it is to buy airtime.

Another big player of the team was Susie Lonie, the vice founder of the project. She decided to move in Nairobi in 2005, because, as she said, "Sitting in a comfortable office in England and deciding what Africa needs is an approach doomed to failure". Her role was to make sure the team was deeply and correctly understanding the Kenyan environment. Plus, she had to understand the systems and capabilities of Safaricom and gain its absolute commitment to the development of M-Pesa.

There was a smaller player that had a vitally important role in the development of M-Pesa. That is, Sagentia, a small technology and product development consultancy firm based in Cambridge, England. The firm had to write the M-Pesa software, and also to design the business processes. Finally, Sagentia provided technical and operational support during the first pilot

and continued after the official launch in 2007. This included running extensive market needs analysis for potential users and stakeholders and extensive prototyping so that the user interface would be accepted.

To work on the first pilot, the main servers were installed in the UK, so that Sagentia's team could write the code. Then, Hughes and Lonie chose three locations for the trial: the city center of Nairobi, Mathari, a small village 20 minutes from Nairobi, and the market town of Thika.

An M-Pesa customer line was created to receive calls from customers and agents with issues, and on October 2005 the pilot started. There were eight agents and a little less than 500 customers at the beginning, which were given a free mobile phone and a few dollars in their M-Pesa accounts.

1.6 Why M-Pesa has been so successful

M-Pesa had various factors that led to its present success. It can be seen that without some of the most important factors, M-Pesa cannot succeed. Vodafone understood than Kenya had all the essential factors that could have helped to create the right environment which would lead to M-Pesa's success.

First of all, Vodafone needed to be already present in the territory with cellular towers and servers, and with a very considerable share of the telecommunication market. Safaricom had an incredibly high market share in Kenya, with more than 80% of the control. Nowadays, as shown in Figure 7, Safaricom controls about 65% of the Kenyan mobile phone market, with 30 million customers.

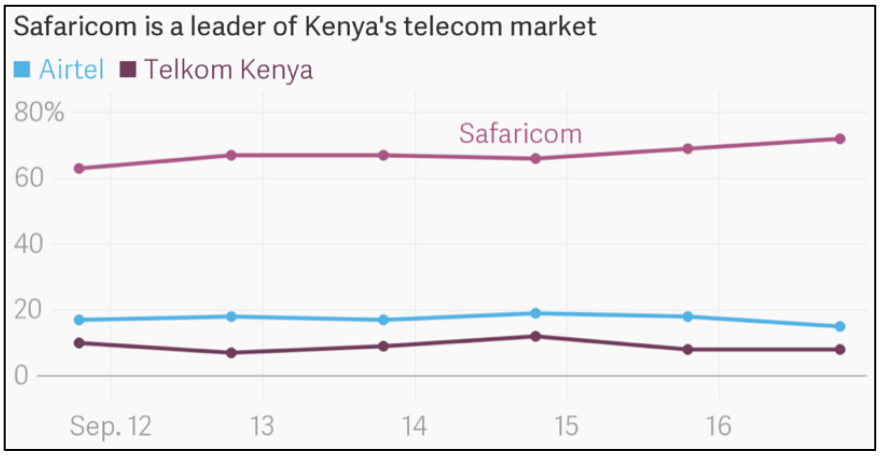
It also had strong brand recognition and trust from its customers, which is essential for M-Pesa's success.

Another reason why M-Pesa had such a strong success was because of a supportive banking regulator and of the Central Bank of Kenya, which permitted to Safaricom to run experiments before the official launch. The Kenyan regulator also served as an advisor through complex regulations which required cooperation with financial and telecommunication regulators. The advisor permitted to Safaricom to run M-Pesa without being regulated as a bank but as a telecommunication firm. Of course, the regulator set rules to protect customers against default. For example, all e-money traded by M-Pesa must be backed 100% by liquidity, which must be held to a financial institution, which is the Central Bank of Kenya. Another rule is that the

interests Safaricom earn from depositing the liquidity used to back the e-money cannot be used by either Safaricom or Vodafone but must be deposited into a non-profit holding.

M-Pesa has been so successful because there was a latent demand for domestic remittance given by the poor quality of existing alternatives. People living in cities need to send money to their relatives who live in rural areas. Before M-Pesa, there were only inefficient services, from the point of view of both time and costs. This new mobile payment system gave the possibility to send money efficiently. There was also a high demand for e-money, which is easier, safer and faster to move especially to distant locations.

Figure 7: Safaricom and its competitors market share in Kenya



Source: World Economic Forum

Safaricom made an enormous marketing campaign for M-Pesa launch, both on television and on the streets. It was almost impossible that people, especially in cities, didn't know about the launch. They also did a perfect job in finding the right slogan for M-Pesa, which is as very simple as it is effective: "Send Money Home". It made clear that its main purpose was for remittance, which was what people needed the most.

In 2008, M-Pesa's "Send Money Home" marketing campaign won the "Best Broadcast Commercial" award at the Annual GSMA Global Mobile Awards in Barcelona. It furthermore won the award for "Best Use of Mobile for Social & Economic Development".

Another reason that M-Pesa was so successful was the capacity to "Keep it Simple" (Nick Hughes). Keeping it simple hadn't been easy, as M-Pesa was a significant innovation which radically changed an important market as it is the payment system market. The team decided to keep M-Pesa simple in order to give the possibility to illiterate people, which in Kenya back to 2007 was a very high percentage of the total population, to use M-Pesa.

The product targeted from the beginning the poorest of the poor, because M-Pesa gives more importance to the volume of the transaction rather than its absolute value.
Since the launch, the M-Pesa interface is easily understandable to everybody, so that also people not familiar with the mobile phone technology can understand the processes.

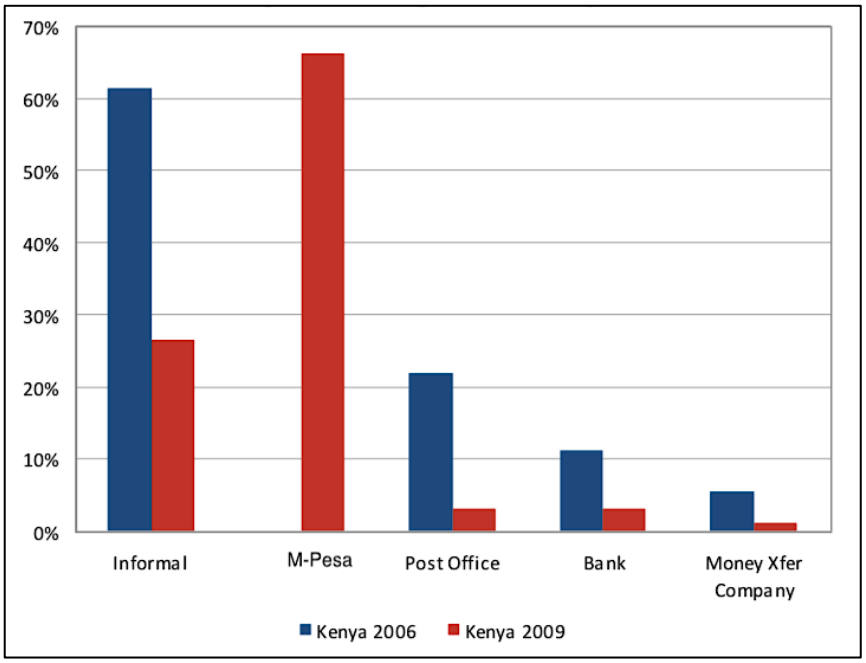
Also, M-Pesa is accessible from all types of phone. People don't have to own a smart-phone, because M-Pesa does not work through an internet connection, but instead, it uses a SIM technology. So, P2P transactions can be done via any phone; the essential feature to perform transactions is that the SIM must have M-Pesa preloaded. If customers didn't have one, they have received it for free during the registration of their account.

M-Pesa is also very simple with its pricing structure: it has always been very transparent in order to get the users' trust, and fees are expressed as an absolute value, rather than a percentage of the value of the transaction. This has been decided in order to help illiterate people understand how much they are going to pay for the transaction. Fees are equal everywhere, and there must be a sign outside the outlet locations which shows all the possible fees.
Then, M-Pesa created a vast network of agents, which enables users to spend less time to get to the nearest outlet to perform cash-in and cash-out transactions. In addition, agents had a crucial role in creating trust towards M-Pesa, spending time explaining how the interface works, how to perform transactions, and making sure people are calm with the safety of their money.

1.7 Effects of M-Pesa on the informal sector, and the gender gap

The informal sector in Kenya accounted for more than 70% of the Kenyan GDP before the M-Pesa launch, and banks had no record of it. Nowadays it accounts for 35% of the GDP and 83% of the employment (Kenya National Bureau of Statistics). It is also calculated that 60% of the people working in the informal sector are aged between 18-35 years, 50% of which are women (IEA Economic Survey).
The informal sector is called *"jua kali"*, which in Swahili literally means "under the hot sun". Jua Kali describes casual workers and small enterprising people who operate in small shops. It also includes artisans and small-scale farmers.

Figure 8: Sending Methods



Source: Center for Global Development, 2012

M-Pesa accomplished to reduce drastically the percentage of people using informal sector for sending money, especially to relatives, as we can see from the graph.

As shown in Figure 8, before the launch of M-Pesa, money used to be sent by the post office's services or by bus companies, either asking for high fees and being inefficient in terms of time. Alternatively, if people didn't want to use those services, they had to make a trip home, in most cases lasting days of difficult traveling. Kenya has a low density (74 people/ km²) because most of the people live in rural areas, and there is no complex road system, especially if you want to go to the most isolated villages.

Those features make traveling difficult and expensive in terms of time and money. Plus, if you travel with a significant amount of cash, you have a high risk of being robbed.

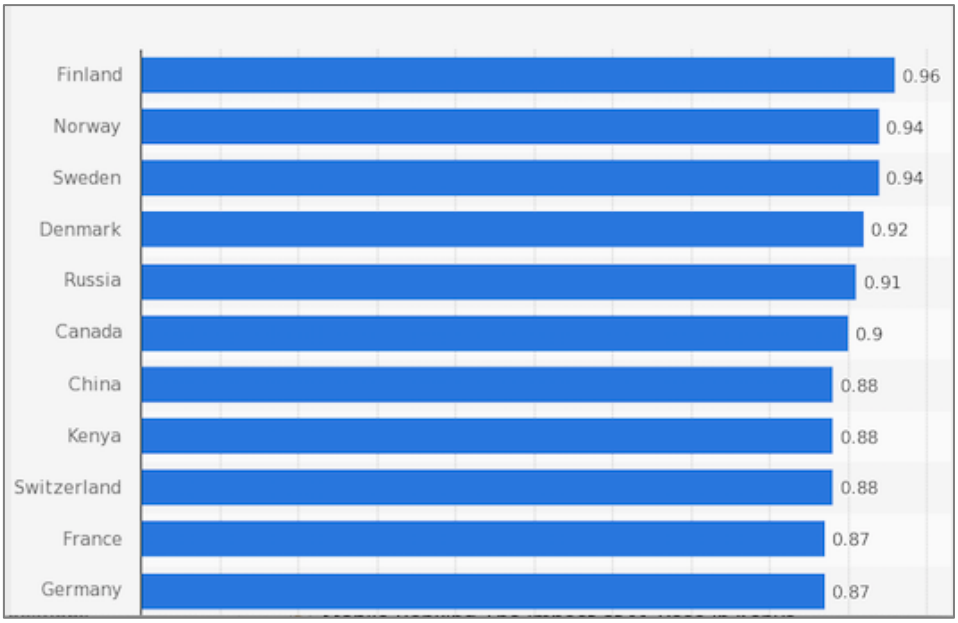
M-Pesa solved all these problems by making remittance faster, cheaper, and more secure.

Income, especially in rural areas, has been increasing at an astonishing rate, which is calculated to be between 5 and 30%.

The highest increases have happened in female-headed families and have appeared to be driven by changes in financial behavior (increased savings and financial resilience) and labor market outcomes, especially for people moving from agricultural jobs into business (Suri and Jack-2016).

Kenya, as we can see from Figure 9, is a country with a smaller gender gap in the labor force relative to other more developed countries, such as Switzerland, France and Germany. However, when it comes to financial inclusion, Kenya still has a margin to decrease the gap; The World Bank estimates that 20% of Kenyans do not have an account, neither with banks nor with mobile payment systems, two-thirds of those are women.

Figure 9: Female to male ratio in the labor force participation, 2012



Source: Statista.com

M-Pesa appeared to help women move out of agricultural jobs and into business and entrepreneurial carriers. One of the reasons for this change is that, on average, women use M-Pesa in a more responsible way, which helps them enhance the efficiency of the time and the money they spend working. Women are also said to be more price sensitive than man and look for cheaper alternatives when making financial transactions.

As **Melinda Gates, Co-Chair of the Bill & Melinda Gates Foundation**, said: *"We already know a lot about how to make sure women have equal access to financial services that can change their lives. When the government deposits social welfare payments or other subsidies directly into women's digital bank accounts, the impact is amazing. Women gain decision-making power in their homes, and with more financial tools at their disposal they invest in their families' prosperity and help drive broad economic growth."*

1.8 Where M-Pesa has worked outside Kenya and why

M-Pesa, after the big success in Kenya, has been exported in other countries, also outside Africa. Vodafone worked to find countries where the environment was the best for the mobile banking and payment system. They looked for countries where there was a latent demand for remittance, the institutions would help the M-Pesa's growth, a large percentage of the population that was not able to access basic financial tools because of large barriers to access formal institutions, and where there was a high penetration of mobile phones. Vodafone also looked for countries where the telecommunication firm had a large share of its market and had cellular towers and servers.

Naturally, the Sub Saharan Africa was the ideal environment for M-Pesa growth, because most of the countries have these factors, like of course Kenya. M-Pesa had in fact been exported in Tanzania in April 2008, the Democratic Republic of Congo in November 2012, Mozambique in March 2013, Egypt and Lesotho in June 2013, and Ghana in 2013.

All these countries had the perfect environment for M-Pesa, in fact, the launch was very successful and M-Pesa is still running in all those countries.

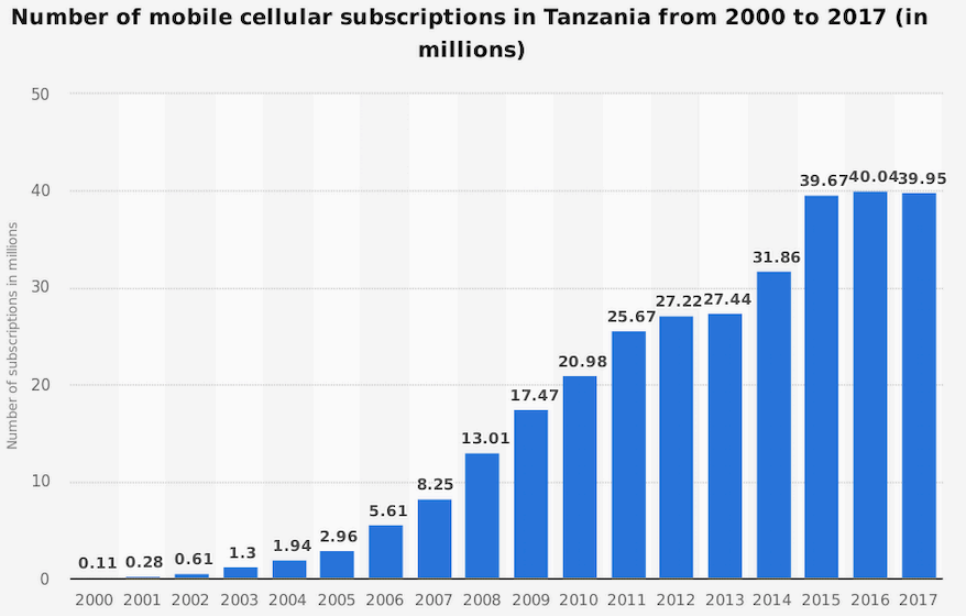
The first country where M-Pesa has been exported was Tanzania. It was launched by Vodacom in April 2008. Tanzania was a perfect environment for the mobile payment system: Vodacom has the largest share of the mobile phone and airtime market, and now it is the second biggest company in Tanzania, with the first being a mining company.

Furthermore, Tanzania has a high penetration of mobile phones relative to other Sub-Saharan countries. It has a population of 57 million people, and almost 40 million mobile cellular subscriptions, as shown in Figure 10. This means that Tanzania has a 70% penetration of mobile phones, compared to the 45% mean of penetration of Sub-Saharan countries (Statista.com).

In 2018, M-Pesa had 8.2 million active users, and has a 42% share of the mobile payment market, making it the leading company in Tanzania's mobile payment industry. M-Pesa managed to create jobs for more than 100000 people, who are working as agents.

Every month, over 35% of Tanzanian GDP is transacted via M-Pesa and the number of transactions has risen to 1.2 trillion per month.

Figure 10: Mobile Penetration in Tanzania



Source: Statista.com

Furthermore, M-Pesa is the only mobile payment system with QR codes, showing the constant technological improvement of Vodacom not only in Tanzania, but in all Africa.

Tanzania's government keeps track of the nation's financial inclusion with an index, which grew from 44% in 2009 to more than 65% in 2017. It is hard to think that the injection of M-Pesa in the Tanzanian economy didn't have any influence on the index.

Furthermore, Vodacom made a deal with MasterCard in 2018 to introduce the first online card in Tanzania: The M-Pesa virtual card. This partnership aims to take the Tanzanian economy cash-less in the future, and to correct a present problem, which is that M-Pesa customers have trouble when they have to make payments on international websites. The only way to pay in those websites, before the creation of the virtual card, was to own a bank account and to put bank details online, which is still seen as risky.

The virtual card will allow M-Pesa customers to make payments on any local or international website as long as Mastercard is accepted for payment.

In March 2009, Vodacom started a partnership with Roshan (Afghanistan's primary mobile operator) to offer M-Pesa in Afghanistan. The system has been given another name, M-Paisa. The two companies started a profit share model. M-Paisa is legally owned by a company named "Mobile Server Development Afghanistan", which is a holding company acting as a trustee of the funds held in the M-Paisa system.

The service's central core was initially to increase the efficiency of the payment of police officers. Wages weren't paid efficiently because it was hard to prevent defections from the Taliban, who were able to pay higher salaries to officers to join their ranks. Soon after the product was launched, the Afghan National Police discovered that 10% of the workforce were "ghost police officers" who didn't actually exist, implying their salaries were being pocked by others. After correcting the new system, many police officers saw an increase even of 30% in their salary as a consequence, and many believed they had a salary raise or that there had been a mistake. As a result, the National Police also discovered that the payment system was so corrupted that policeman didn't have a clear idea of their actual salary because, while cash was passed down from the officers, they would steal a part of it.

Apart from the use of the Afghan police, M-Paisa found a mixed environment in Afghanistan, with some features help its growth and some that could bring it to fail.

In 2014, there had been a scandal in Afghanistan: the Kabul Bank scandal. Investigations have found a big implosion of corruption, which brought to low the credibility of the Afghan government and its foreign investors. Since then, Afghans have lost trust in the banking sector, which had been so low that nobody put its money into a bank account. So, after the scandal, there had been an increase in demand for e-money, which demand went to mobile payment systems like M-Paisa.

Furthermore, Afghanistan had a high mobile phone penetration level (55% in 2009), and very low financial inclusion, with only 3% of the population having a bank account

The Central Bank of Afghanistan helped M-Paisa, regulating mobile money services as payment system providers instead of regulating them as banking activities. It also passed new legislation during the M-Paisa pilot to help e-money movements.

A feature that didn't support M-Paisa was the mobile phone market, which lacked a "champion" because the market was very competitive and there was no interoperability between the four major companies.

A second characteristic of the Afghan environment is that there is no substantial demand for remittance; people in Afghanistan live almost exclusively in cities, so it's not common to have the family in another place far away, or to have a person who has to move away in order to seek a better life.

M-Paisa, given the different environment, has different primary services with respect to M-Pesa's ones. The main services are microfinance and loan reimbursement. It also offers remittance, salary reimbursement, airtime purchase, and bill payments. M-Paisa mostly responded to strong demand for microfinance loan repayments, while the other services have a low demand.

1.9 Where M-Pesa didn't work and why

There have been countries where M-Pesa was launched but shut down after a couple of years because it didn't achieve the success Vodafone was hoping for.

The most critical issues that M-Pesa faced in these countries, which are the factors that didn't lead to the success of the product, are the lack of trust from the local regulators, which didn't help the growth of M-Pesa as it happened in Kenya, because they were not certain of the capacity of M-Pesa to stop money laundering and terrorist financing.

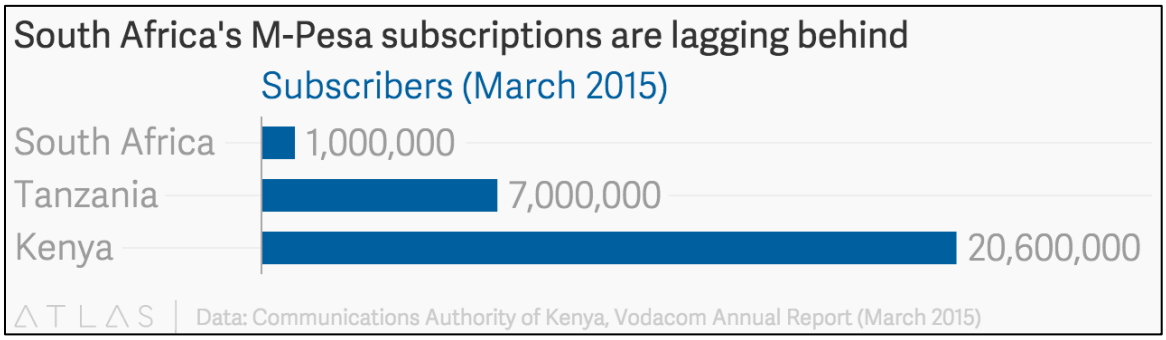
Another issue was the lack of a dominant, quasi-monopoly service, which was caused by a smaller share of the market by Vodafone compared to the 80% share they have in Kenya via Safaricom. This issue has been called "lack of a champion" by the World Economic Forum, which means that only a single entity can provide an end to end delivery mechanism. If a country has multiple mobile financial services, they work only if there is operability between them. Because of the lack of a dominant position by Vodafone, the mobile financial services were not optimized, because people couldn't move money from one service to another easily. The mobile systems, especially M-Pesa, work the same way of the phone services: it works only if it has a large number of customers: if you are a customer, but you cannot use the service because, for example, none of the shops close to your house use it, the service becomes useless, and people stop using it. So, for mobile payment systems to work, the environment needs cooperation between mobile operators and financial services, which is very rare because all the players want total control over the service, or, alternately, the environment needs only one "champion", a company with a share of the market large enough that it can operate and deliver the service alone.

These have been a few countries where M-Pesa didn't work, and it was for at least one of these reasons. Here some examples show why Vodafone exported M-Pesa and why it didn't work at the end.

In September 2010, Vodacom announced the launch of M-Pesa in South Africa. M-Pesa was exported in South Africa because the country had an estimated 13 million people who lacked access to formal banking services. Also, South Africa is a country where mobile phone penetration is very high, in fact in 2016 was over 90%, with one-third of the phones being smart-phones. South Africa was a potentially good environment because Vodacom was the largest telecommunication company in South Africa, with more than 38 million customers. However, the second largest competitor, MTN, had a number of customers that weren't far

away from the one of Vodacom, so there was a “lack of champion”, and the telecommunication market in general was very competitive.

Figure 11: M-Pesa in South Africa



Source: Vodacom Annual Report 2015

Vodacom chooses 2010 as the year to launch the product because South Africa was hosting the football World Cup, and all the media were talking about its economy, which could give M-Pesa an international recognition.

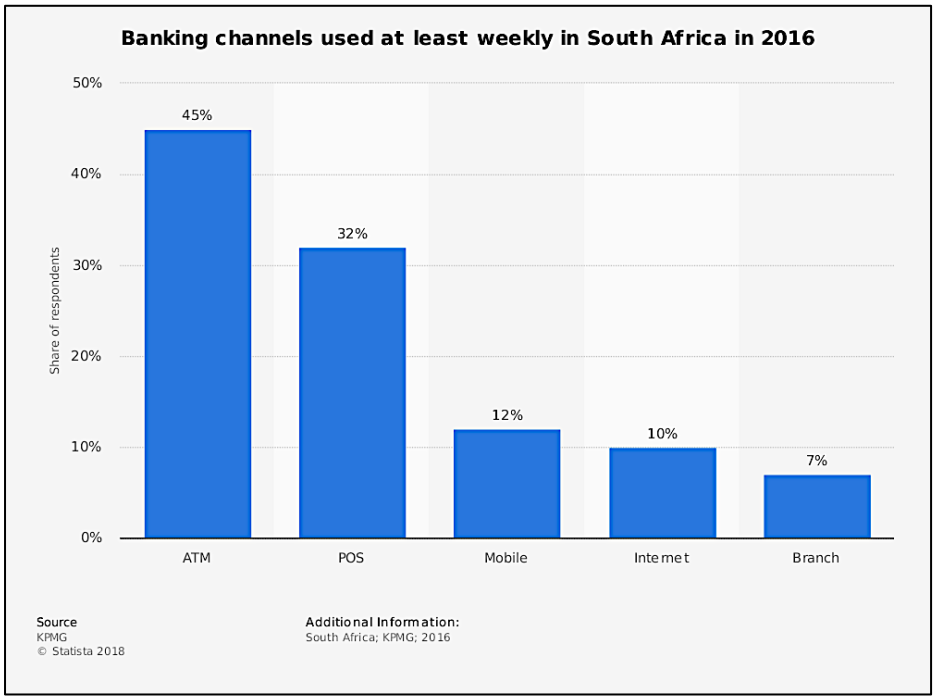
Before the first launch, the South African government had some objections regarding Vodacom entering the mobile payment market. To nullify those objections, Vodafone transferred the 35% of its stake in Safaricom to its South African subsidiary, Vodacom, for an operation costing $2.6 billion. This operation aimed to show the South African government the commitment of Vodafone, which kept only 5% of its stake in Safaricom, losing all the veto rights they had to choose the chief executive.

Vodacom thought it could build a 10 million customer base in 3 years, given the large base on financially excluded people.

However, after more than five years, M-Pesa had 1 million subscriptions, as shown in Figure 11, with only 76000 active users. There have been different reasons that didn’t lead to the success of M-Pesa that was having at that moment in Kenya and Tanzania.

The first reason was that, although 13 million people were financially excluded, 75% of the adult population in South Africa had a bank account; that is because the banking sector was very competitive and developed, with a large number of ATMs across the country. As shown in Figure 12, South Africa had a healthy banking sector, with more than half of the adult population using ATMs and POS weekly.

Figure 12: Banking channels used at least weekly in South Africa in 2016



Source: Statista.com

Also, there were banks offering excellent financial services, including mobile money-sharing services. The banking sector had been growing 7% every year for a few years. Additionally, there was a service called “First National Bank’s e-wallet”, made by the homonym bank that is the one with the higher customer satisfaction in South Africa, which enables customers of the bank to send money via mobile phone to anyone, also who didn’t have a bank account.

So, another reason for which M-Pesa didn’t work is because there was no latent demand for remittance, both because there were already mobile banking services, and because the urbanization of South Africa is different from the one of Kenya, because people live in cities rather than rural areas, so there is low need for remittance.

Another reason that didn’t lead M-Pesa to the success hoped was a weak marketing campaign. Vodacom launched the product three times, hoping it would finally increase the customer base of M-Pesa. What they did wrong is that they actually sent mixed signals, and confused potential customer about what was M-Pesa final service; they launched M-Pesa describing the service as a “mobile money solution”, the second time as a “mobile money wallet”, and the third time as a “platform to allow swipe-and-buy with Visa cards linked to your phone”.

In South Africa, Vodacom encountered an uncooperative and hostile banking regulator, which forced M-Pesa to partner with a local bank, Nedbank, to enter the South African mobile banking market. Nedbank was the second largest bank in South Africa in 2010 and had strong customer satisfaction, but from the non-customers, it was seen as a middle-class and high-income bank

only. Furthermore, Vodacom encountered onerous administrative requirements for cross-border mobile money transfers. Additionally, South Africa has stricter banking rules and regulations than those in Kenya.
Lastly, South Africa has been going towards a cash-less society before m-Pesa tried to enter its market; South Africa is a country with a massive problem due to a high level of crime in the cities. In fact, workers had to open a bank account, because firms wouldn't pay the salaries in cash due to the very high risk of being robbed. Instead, they would make a payment via check or transfer.
In June 2016, Vodacom finally decided to shut down M-Pesa due to the low uptake and the impossibility to succeed in an inadequate and hostile environment.

Another country where M-Pesa didn't work as expected was Romania, which has been the first European country where Vodafone tried to export M-Pesa in March 2014. The team of Vodafone chose Romania as it is a country which had almost 10 million people, more than a third of the population, who didn't have access to formal banking services, and with more than 7 million people who performed day-to-day transactions mainly in cash.
So, Romania had a cash-dependent economy, and it also had more citizens owning a cellular phone than financially included ones. The goal of M-Pesa was to give the possibility to people with a phone but financially excluded to become customers and start having access to the financial products M-Pesa offers.
Vodafone launched M-Pesa with a dominant position of the Romanian mobile provider market, with 40% of the market share. It also had more than 300 stores, retail outlets and authorized agents across the country. Furthermore, it had about 8 million customers out of the 21 million population, with a vast majority being active mobile phone users, and a massive presence of cellular towers and servers present on the territory.
A key factor for M-Pesa to be successful is the expansion of its agent network, so Vodafone expanded it since the beginning to a total of 2000 agents at the end of the first year M-Pesa was launched.
M-Pesa offered in Romania all the available products that could be executed via M-Pesa; people could buy airtime, perform P2P transactions, make deposits and withdraws, microfinance loan repayments, insurances, and purchase goods and services with the app.
Vodafone partnered with a Romanian bank, Raffeisen Bank, in order to offer a saving account that pays interests.
M-Pesa aimed to sign up 10 million customers within the first three years in the Romanian market. After the three years, M-Pesa hadn't reached its goal, and it didn't even get close. So, Vodafone decided to close M-Pesa in Romania in December 2017 to limit the losses.

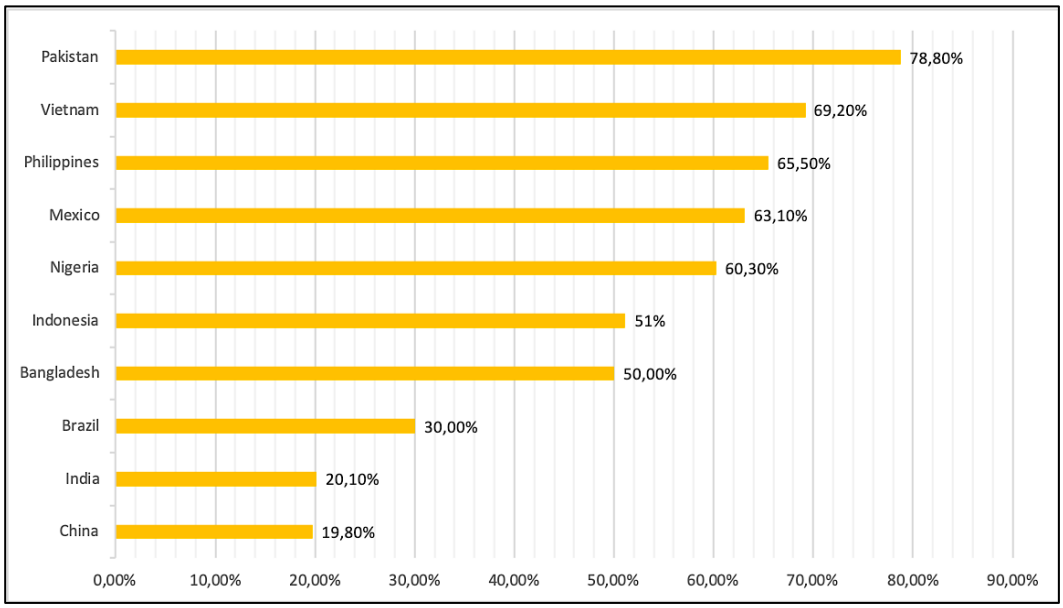
CHAPTER 2: Financial Inclusion

2.1 Financial Exclusion

"Financial inclusion is the pursuit of making financial services accessible at affordable costs to all individuals and businesses, regardless of net worth and size, respectively. Financial inclusion strives to address and proffer solutions to the constraints that exclude people from participating in the financial sector. It is also called inclusive financing." (Investopedia.com).
So, the term financial exclusion refers to the situation in which financial services are not available to a customer.

From the Global Financial Inclusion Index Database 2018 of the World Central Bank, we can see that today, 31% of the world population over 15 years old are financially excluded, almost 100% of them living under absolute poverty, which means they are living with less than $2 a day. The percentage decreased from 38% in 2014 and 49% in 2011.
The Global Financial Inclusion Index, or Global Findex, measures since 2011 financial inclusion around the world. The project is funded from the Bill & Melinda Gates Foundation and it is the most detailed data set on financial behavior of the global adult population. The Findex provides information on how people save, make payment and how they use credit.

Figure 13: Countries with the largest percentage of unbanked adult population in 2018



Source: Global Findex Database

From the data of the World Bank and the Global Financial Inclusion Index, summarized in Figure 13, there are 1,7 billion adults who lack access to financial services. China is the country with the highest number of financially excluded people, with 224 million people, but with a relatively low percentage of the unbanked adult population, around 20%, which is lower than the worldwide 31% of the adult unbanked population. The country with the highest percentage of the financially excluded adult population is Pakistan, with 78.7%. Furthermore, 90% of adult female are financially excluded in Pakistan, and 65% for male.

Financial services can be unavailable for multiple reasons: it can be for a geographic distance reason, which means that people don't have physical access to financial services because they don't have availability close to where they live. It is frequent for people who live in rural and poor villages, which are far from cities and are badly connected. Alternatively, it can be for a cost-effective reason: banks have high fixed-costs to implement and maintain branches, so when it comes to having poor people as customers, it is not worth the cost for banks to let them open an account. This leads to the geographic reason for financial exclusion because banks don't have incentives to open branches in poor and rural areas. In another case, it happens that banks ask for a minimum deposit, and a minimum balance to open a bank account: poor people often don't have enough money to open it and are unable to take advantage of the service.

Poor people are usually illiterate; this leads to a problem that we take for granted: documentation and paperwork. Banks don't restrict people from opening an account just because they are illiterate, but these people have restricted facilities. In India, for example, an illiterate individual needs two literate witnesses in order to open an account, which can be an obstacle for people with no family. Additionally, they can only get debit cards and cheques, and it is mandatory for them to be present in the bank for withdraws, denying them the possibility to use ATMs. In all countries there are some restrictions, which makes less attractive the bank account, discouraging illiterate people.

Furthermore, another obstacle that prevents people from opening an account with a bank is the requisite of having an ID. It is common in rural areas to find people, mostly living under the poverty line, who don't have a national ID. Both mobile money systems such as M-Pesa and banks require a valid national ID in order to register for an account. For example, in Kenya, not having an ID is the first reason people didn't open a bank account, while it is the second most common problem from opening a mobile money account. (Global Financial Inclusion Index).

One of the biggest obstacles that prevent people from opening a bank account, and probably the toughest to solve, is the lack of trust against formal financial institutions. For many years, banks have exploited people's weaknesses, especially in poor areas. This has led people to be skeptical to give their money to banks. Mobile money systems have been the first to overcome

this lack of trust, by ensuring customers with the safety of their money by being transparent in all their aspects. Mobile money systems have done commercial agreements with different commercial banks to increase their businesses and to give a more extensive variety of products to their customers

Financial inclusion is one of the most effective tools to decrease world poverty. That is why, in September 2015, the United Nations General Assembly approved the 2030 Agenda for Sustainable Development, alongside a new set of development goals which are called Sustainable Development Goals (SDGs). The main objectives of the agenda are to end world poverty in all of its forms and to create a more sustainable world economy. It was endorsed by all the 193 member nations of the General Assembly in New York.

The SDGs contain 17 very ambitious goals, shown in Figure 14. Although the SDGs do not explicitly focus on financial inclusion, an increase in access to financial services is crucial in order to achieve many of them. The Agenda also outlines opportunities for governments and private businesses to expand financial inclusion in emerging countries by paying wages not by cash but electronically.

The SDGs can be achieved only with a global partnership between all countries, developed and developing.

Figure 14: Sustainable Development Goals

Source: United Nations

Nowadays, the Division for Sustainable Development Goals (DSDG) in the United Nations Department of Economic and Social Affairs provides the Global Sustainable Development

Report (GSDR), which plays a crucial role in the implementation and of the evaluation of the 2030 agenda. It also provides support for the SDGs and their related thematic issues.
Additionally, the Member States and the UN are using the Global Financial Inclusion Index Data as a tool to keep track of the progress toward SDGs.

Financial inclusion provides individuals with the opportunity to save in order to contrast future instabilities and shocks in income, and it enables opportunities to make investments and access to credit, which is fundamental to manage short term liquidity need. According to the SDGs, it can also reduce hunger and poverty, make cities and businesses sustainable, and improve gender equality.

It is imperative for any country to have an enabling environment which makes possible the increase in financial inclusion. Any country must have not only banks and microfinance as key participants in the provision of financial services, but also fintech firms and mobile money operators. This will make the market more efficient and competitive, which will push firms to provide a better and less expensive product for medium and low-income customers.
Governments must create incentives to create enabling environments by ensuring financial integrity and prudential stability for low-income users with regulations and supervision of financial products.

According to a report of the "The Economist Intelligence Unit", the "2018 Global Microscope", regulators and governments must ensure that new innovations have to be accessible to all customers and have to connect them with an extensive set of financial products in order to reach high levels of financial inclusion. According to the report, countries need to have a financial inclusion strategy and specific inclusion goals and specific commissions and regulators.
In Kenya, for example, the success of M-Pesa has been made possible also thanks to the help of the Kenyan regulator, which helped Safaricom by advising through complex regulations.

The report also states that restrictions and regulations must be proportionate to the customer-risk the services provided. Otherwise, companies won't enter the market if regulations are too complex and restrictive and there are no possibilities to make a profit. If companies do not enter the market, countries won't have a competitive market which provides financial products, thus it won't reach a high level of financial inclusion.
The report finds another key element to reach a high level of financial inclusion: interoperability. It means that different payment systems can communicate with one another.

In a competitive market with multiple players that provide payment systems, it is crucial that customers can exchange e-money also with people who have a different provider. Otherwise, if people can send money only to people with the same product, it will limit the full operativity of mobile payment systems, making it almost useless. The report mentions China as an example of how interoperability has been essential to ensure financial inclusion: all payment systems are all connected to a real-time platform, which enables money to move from a provider to another.

A different example is Kenya, which doesn't provide interoperability between different systems, but has achieved a high level of financial inclusion. That is because M-Pesa has a dominant position in the mobile payment market, with almost 80% of market share (Figure 5). So, customers don't need interoperability simply because the need to send money to someone with a different provider is almost null. However, this is a rare event, most countries have a competitive market or seek to create one, without allowing a big player to control a dominant share of the market. So, governments and regulators must find a balance between enabling financial inclusion, protecting customers' interests and keeping safe the integrity of the financial system.

There are two types of finance that various studies indicate them as great and effective tools to reach out to the financially excluded portion of the world population and give them the possibility to perform financial transactions. The first type is Digital Finance, which describes all the financial products delivered through mobile phones and any device connected to the internet, giving the possibility to users to perform various transactions without the need to deal directly with a bank branch or any financial services provider. This becomes a very important feature when it comes to underprivileged people living in poor rural areas that are inadequately connected to cities and less-poor communities where bank branches are.

Then, there is Micro Finance, which is the delivery of all financial services to poor people by performing those services with a smaller amount of money. Micro Finance's main core is to reach the demand of poor people while proving a return to financial institutions without having to encounter a large risk for banks.

2.2 Digital Finance and Microfinance

Digital finance is the concept of delivering a financial service to customers via mobile phones, credit and debit cards linked to a digital payment service or the internet.

Digital finance is a cost-effective product which can increase the level of financial inclusion around the world and it is easier to understand for low-income customers, as it offers a simpler and greater control of personal finance just by using a mobile phone, and it provides lower costs for the banking industry to deliver products in a safer and faster way.

Access to digital finance provides a wide range of services, from mobile banking, to e-wallets and mobile wallets. Since it provides electronic money, it also enhances security for customers' cash. Users don't have to keep their savings in cash at home, which were previously subject to loss or thieves. Furthermore, keeping savings in cash in developing countries with unstable inflation causes an actual loss in the value of your savings, while if customers store savings in a mobile wallet for example, they can earn interests and reduce the loss in value.

Additionally, an increase in electronic money is beneficial to governments too, as it could decrease the quantity of fake and bad money in the economy, it could decrease corruption, and it has the potential to decrease off-the-books work and tax evasion. An increase in electronic money could also help emerging countries' Central Banks by giving them more control over the money supply, increasing the effectiveness of monetary policies.

According to Consultative Group to Assist the Poor (CGAP), a World Bank Institution, there are three key elements of services delivered through digital finance: a digital transactional platform, retail agents, and a device used by customers and agents to transact, usually a mobile phone. The digital transactional platform allows users to perform transactions and to store electronic money into their e-wallet. The agents, through its digital device, allow customers to convert cash into electronic money and vice versa.

One of the first digital finance product ever created is PayPal, which in 1999 already offered internet and mobile banking. Furthermore, M-Pesa and its added-value products are other examples of digital finance, since they provide the products via mobile phones to customers.

The study of Manyika et al., 2016 "Digital finance for all: powering inclusive growth in emerging economies" discovered how digital finance could bring benefits in aggregate expenditures and thus GDP and government tax revenues. If a digital payment platform is provided, there is an increase in the volume of transactions, which will bring an increase in aggregate demand. This increase will bring a higher level of GDP and it will also produce higher tax revenues because people have to pay a higher level of taxes given an increase in their income

and consumption. It is calculated in the study that digital finance could boost emerging countries' GDP by $3,7 trillions by 2025.

When people have access to digital finance, those users are defined as digitally financial included. According to the CGAP, digital financial inclusion is a "*digital access to, and the use of, formal financial services by the excluded and underserved population. Such services should be suited to customers' needs, and delivered responsibly, at a cost both affordable to customers and sustainable for providers"*.
Digital financial inclusion's concept is very similar to financial inclusion's one, with the difference that indeed the first one includes only people with digital access to financial services. Another difference is that, in developing countries, where financial institutions have a smaller possibility of revenues because of the lower value of the transactions, digital finance is more convenient as it reduces fixed costs because it decreases the importance, and thus the number, of bank branches, it decreases the manual paperwork because all the transactions' paperwork is automatic and electronic, and it decreases the cost banks have for every customer deposits.

Digital finance provides financial services that are easier to use than formal services. This enables poor people to use those services to perform basic financial services, from P2P to the payment of bills and school fees. For example, one of the features that made M-Pesa so successful is that it is very easy to understand and use. It has a simple and intuitive menu, where there are listed all the transactions users can perform. It is an essential feature if the targeted audience is composed of financially excluded people who live under the poverty line, as it can happen that those people have a limited education.

Microfinance is considered one of the best tools to increase the level of financial inclusion in developing countries as it can achieve poverty alleviation in a cost-effective way.
It is a tool to provide credit to previously financial excluded people living under the poverty line, so as to empower them to improve their living conditions and raise their income levels. The core of microfinance is that the access to credit and other financial services is provided on a micro-scale, which means that the quantity of money is less than the one circulating in "standard" finance.

Microfinance increases the propensity of savings when it comes to people living under the poverty line, it encourages entrepreneur behavior and it uses credit to meet the demand for

short-term liquidity. It is also a less expensive way to provide products such as insurances, pension programs and demand for remittance.

The Consultative Group to Assist the Poor (CGAP), the World Bank's in-house microfinance agency, defines microfinance as:
"Microfinance is often defined as financial services for poor and low-income clients offered by different types of service providers. In practice, the term is often used more narrowly to refer to loans and other services from providers that identify themselves as "microfinance institutions" (MFIs). More broadly, microfinance refers to a movement that envisions a world in which low-income households have permanent access to a range of high quality and affordable financial services offered by a range of retail providers to finance income-producing activities, build assets, stabilize consumption, and protect against risks. These services include savings, credit, insurance, remittances, and payments, and others."

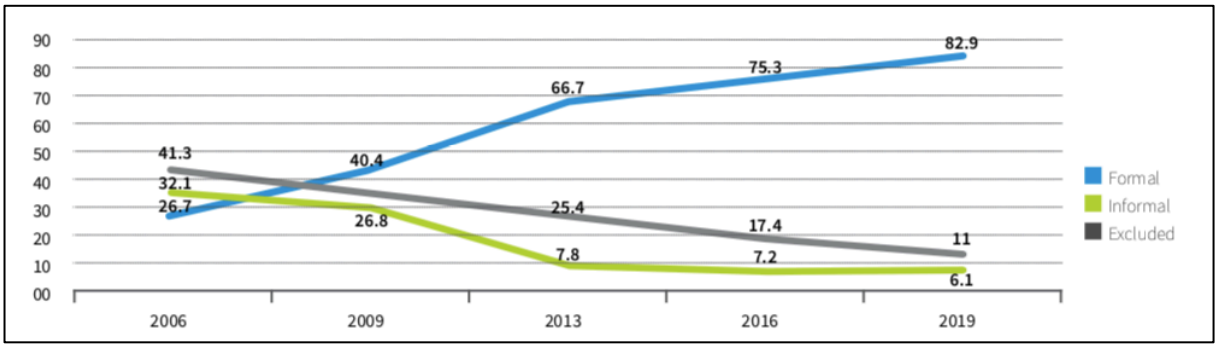
Microfinance is suited for middle and low-income customers because it provides all the services it is provided in finance, but with a smaller amount of money. Thus, low-income users can repay the interests on their small-value loans, they can pay for their pension with small transactions, and can cover part their possessions with insurance.
The concept behind the creation of microfinance is that small amount of liquidity can help financially excluded people engage in entrepreneurial activities that can help grow their way out of poverty.

2.3 M-Pesa and Financial Inclusion in Kenya: An Empirical Study

M-Pesa had a considerable impact on financial inclusion in Kenya. In fact, as it can be seen from table 14, the percentage of the Kenyan population is much higher than in the other African countries, as it is one of the "lightest" countries in the graph in the African area.

In 2019, as we can see from Figure 15, Kenya has almost 89% of the adult population financially included, looking at both formal and informal access. The results are stunning, as in 2006, Kenya had 41.3% of the population financially excluded. Furthermore, 98% of Kenyan financially included have a mobile money account, which shows how especially M-Pesa had a positive impact on the percentage of account ownership (FinAccess Report 2019).

Figure 15: Access to financial products in Kenya



Source: 2019 FinAccess Households Report

According to the 2014 Suri and Jack research, M-Pesa has lifted out of poverty more than 2% of Kenyan families, just by giving them access to basic financial products. This research also found out that there has been no reduction in the consumption of M-Pesa users facing shocks, while non-user households experienced a 7% reduction of consumption. This is because people, thanks to M-Pesa, have the possibility to receive remittance from family and friends within minutes.

M-Pesa, as a mobile payment service, has increased the level of financial inclusion in Kenya by giving access to users to basic financial services, such as having an account, having the possibility to convert cash into e-money, giving a tool for remittance, managing personal finance, and so on.

However, the most important aspect of financial inclusion is giving a tool which permits saving; M-Pesa has increased the likelihood of saving, but the mobile payment platform itself doesn't enable saving because there are no interests on deposits.

From an empirical study of Kenya's financial access survey data of 2019 (2019 FinAccess Report), it can be concluded that M-Pesa not only boosts the propensity of users to save, but it also increased the amounts saved, thanks to the convenience and the efficiency of the system that permits frequent and small-value transactions.

The Financial Access Survey has been implemented yearly since 2006 by the Central Bank of Kenya, Kenya National Bureau of Statistics, and the Kenya Financial Sector Deepening. The FinAccess Survey has been created so that it can be an effective tool used to monitor the levels of financial inclusion in Kenya, by giving information about the usage and access of financial and banking services.

The study's empirical evidences underline that M-Pesa users are more likely to save than non-users, because access to financial services in general facilitates the saving procedures and reduces costs and make transactions more efficient.
The results of the study show if certain variables affect saving behaviors positively or negatively. For example, education is a very significant variable: people with a high education were and are more likely to have access to financial education. Thus, having a higher level of financial literacy means that these people have a deeper understanding of financial services and about their uses, therefore they are more likely to have healthy behavior for their wealth, like saving.

The study also shows that women are more propense to save but have an overall lower level of value of these savings relative to men. This is probably because, although women have a higher propensity to save than man, women have lower incomes and the majority of women work in the informal sector, which is characterized by low and irregular wages.
Another variable that the study analyzed is family size, which has a negative relationship with the amount saved. If you have people that are dependent from your income, and you have a higher demand for money, the propensity and the possibility to save decreases as the number of people in your family increase.

Furthermore, the FinAccess 2019 shows that of the people who save, 53,6% of them save by using mobile money providers, and almost 26% save by using bank savings accounts.

Figure 16: Savings instruments use by type of provider (%)

	2006	2009	2013	2016	2019
Formal					
Bank Savings Account	12.4	12.4	9.8	24*	25.4**
Postbank Account	5.6	2.5	2.3	1.5	0.3
SACCO	12.8	8.9	10.6	12.6	9.4
MFI/MFB	1.5	3.2	3.1	3.3	0.7
Mobile Money	n/a	n/a	27	43.3	53.6
Informal					
Group/*Chama*	34.7	37.1	26.8	39.2	30.1
Group of Friends	10.9	5.5	12.2	9	4.6
Family/Friend	16.6	11.6	19.2	15.4	11.8
Secret Hiding Place	27.9	55.7	31.7	35.8	23.6

*constitutes 16.8% of savings in mobile bank accounts **constitutes 19.2% savings in mobile bank accounts

Source: FinAccess Survey 2019

Additionally, Table 16 shows that after the launch of M-Pesa in 2007, the number of people saving by storing money into secret hiding places has dramatically decreased, from 55,7% to just 23.6% in 2019. This shows how people use M-Pesa also as a safe store of value for their savings.
Furthermore, SACCO, which are savings and credit cooperatives, and post bank accounts are one of the examples of financial institutions that were already existing prior to M-Pesa and were having customers mostly because of a lack of competition. As shown in Figure 16, these two formal financial institutions lost a large share of customers with the uptake of M-Pesa as a saving tool, given its higher convenience and

Another interesting change in these savings instruments is the volatility of the change of number of people using bank savings account. As shown in Figure 16, prior to M-Pesa, its use was of 12.4%, while in 2013 it decreases to almost 10% because people were starting to use M-Pesa, which was more convenient and secure.
Given the strong competition of M-Pesa with the banking sector and its exceptional growth it was to be expected a similar trend for the future, with customers using M-Pesa to save because of its convenience and its digitalization. However, in 2013, the use of bank savings account rose to 24%, which constituted 17% of savings in mobile bank accounts. The change in this trend is given by the help M-Pesa has actually provided to the banking sector. Safaricom has concluded multiple agreements with Kenyan commercial banks in order to create value-added products that would enable and increase saving and microcredit. Those partnerships created a bank account that customers could open and manage via the M-Pesa app, on the menu. Furthermore, those value-added products created an enabling environment for customer to start saving using an appropriate product, which has interests on deposits, and increased the number of people savings and, additionally, increased the use of bank savings account. In fact, the positive trend has resisted in 2019 too, with a use of 25,4%, which constitutes 19% of savings in mobile bank accounts.

According to the study “M-Pesa and financial inclusion in Kenya: of paying comes saving?” of Hove and Dubus (2018), two statistical studies use different definitions of savings when they perform the interviews to M-Pesa customers. The differences between the Financial Inclusion Index (FII) and the Financial Access Survey (FinAccess) is that the FII asks to interviewers if they are “saving for a future purchase of payment”, while the FinAccess asks to choose some reasons why customers use M-Pesa, and one of the choices is “for saving purposes”, but the definition of saving is determined by the single respondent.

Anyway, the empirical studies of the two surveys are very similar, with most of the variables having the same correlation with the propensity to save and with actual saving using mobile payment systems like M-Pesa.

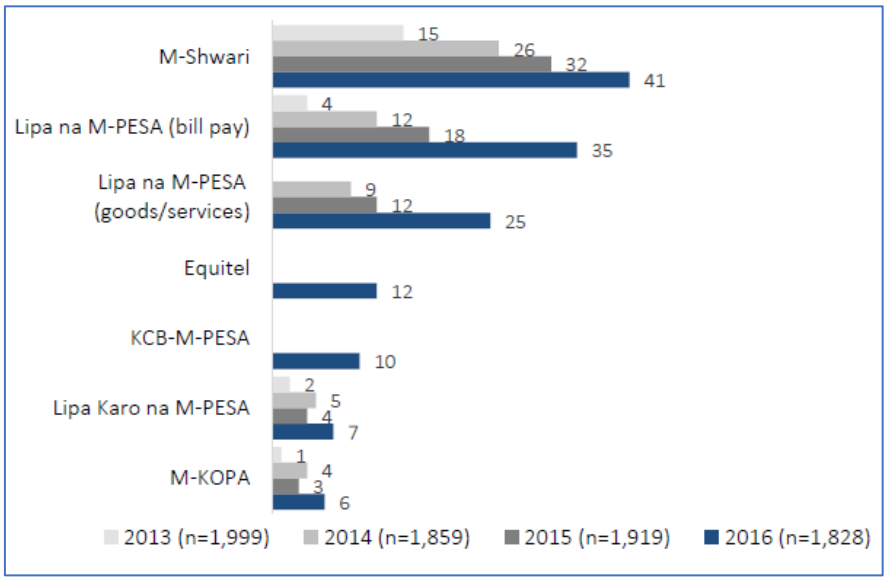
2.4 M-Pesa Value-Added Products

Various M-Pesa value-added products like M-Shwari, Lipa Na Pesa, and Fuliza make mobile money a gateway to services from other formal institutions, such as banks and money aggregators linked to the M-Pesa menu.

These products add value to customers' financial situations by offering a convenient credit resource and savings utility.

For example, M-Shwari is a digital credit service offering a combination of saving and loan products in Kenya. It is offered by a partnership between the Kenyan mobile provider Safaricom and the Commercial Bank of Africa (CBA). It has been launched in November 2012, and it has immediately had a great success, with more than 22 million customers in 2018 (Safaricom annual report 2018).

Figure 17: Use of M-Pesa value-added services



Source: Safaricom Annual Report 2017

M-Shwari, standing for Mobile and "calm" in Kiswahili, is a bank account free to open, without any monthly fee, and it doesn't require a minimum balance at any time. M-Shwari accounts

have the same transactional and balance limitation as M-Pesa since users open an M-Shwari account from the M-Pesa menu.
Furthermore, customers can transfer funds between M-Pesa and M-Shwari freely for an unlimited number of times, and M-Shwari can be easily accessed via the M-Pesa menu.
M-Shwari is an innovation that is being used to drive financial inclusion in Sub-Saharan countries and that could be used globally. M-Shwari is a banking product, as it offers interest on deposit, access to credit, and deposit insurance using M-Pesa's infrastructure. In fact, it has been accessed by unbanked people via M-Pesa. According to Financial Inclusion Insights, in 2015, 54% of M-Shwari users were people without any other bank account. This shows the great support of M-Shwari in the development of financial inclusion in Kenya.
This product has been the first large-scale service that taps into digital information of the unbanked population of Kenya to make credit-scoring decisions.
M-Shwari embodies the next frontier of digital financial services as it proves that mobile money infrastructure can be leveraged in order to offer higher value financial services at scale.

M-Shwari, as it can be seen from Figure 17, has had great success in its inception in November 2012, since it is the most used M-Pesa related product, which solves a real problem that Kenyan had: on-demand liquidity. In fact, it provides the possibility for customers to manage their short-term liquidity while providing a return (the interest on the money deposited) for the future. It has been a success because it solved a real financial need that wasn't covered by the formal banking sector while delivering it in the right way: it is accessible to all, it provides real-time feedback, it has simple rules, it pays interest on deposits, and it provides a credit history to its customers.
The difference with M-Pesa is indeed that M-Shwari provides an interest-bearing deposit, while M-Pesa doesn't because Safaricom is not allowed by law to provide this kind of service, as it is regulated not as a bank but as a mobile operator.
In fact, M-Shwari offers a bank account offered by CBA and it is regulated as any bank account in Kenya. CBA carries out all the risks and losses related to non-performing loans, and it has to manage information systems and all the regulatory compliance. CBA created whole insurance for deposits up to about $1200.

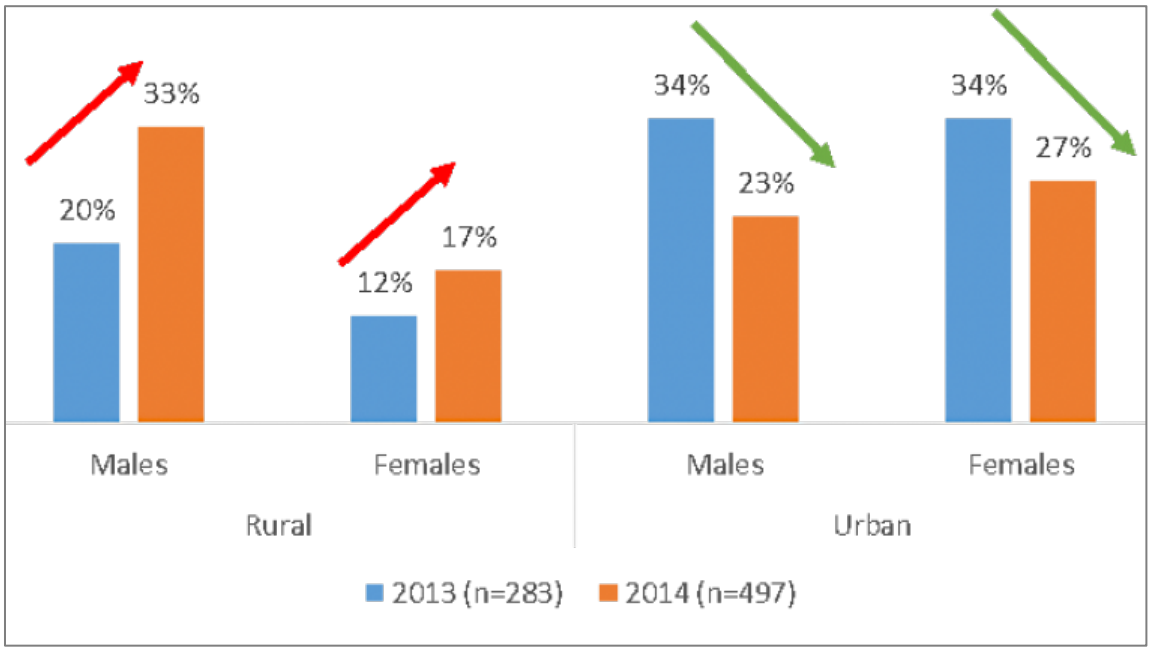
M-Shwari is a new channel for users to have access to short-term loans and to balance the need for liquidity in the short-term; it has been kept "simple" like M-Pesa, as it is easy to understand how it works and it rewards customers for "good behavior" quickly.
Only after three years since inception, M-Shwari had over 10 million customers and a rate of 50000 loans disburses every day for a value of $92 million. Furthermore, $278 million have

been deposited into M-Shwari. At that time, M-Pesa had 30 million customers, which means that 33% of M-Pesa active users were also active M-Shwari users.
M-Shwari offers an interest which varies between two and five percent, based on the user's average daily balance. Customers can apply for loans, which can be approved in a couple of seconds. Any user has a loan limit that he/she can check at any moment in the menu.

M-Shwari is used to enable micro-finance: in fact, the average loan is low, around 15$, and it is issued with a low duration.
All the loans have a duration of 30-days loan and come with a 7.5% facilitation fee.
M-Shwari has helped to increase access to formal banking services, thus increasing financial inclusion in Kenya.

The Financial Inclusion Insight (FII), a program funded by the "Bill and Melinda Gates Foundation", is a research program aiming to build meaningful knowledge about the health of the financial sectors in Kenya, Indonesia, India, Tanzania, Nigeria, Uganda, Bangladesh and Pakistan. The FII studies financial inclusion in these countries using indicators such as account ownership and mobile money awareness, and demographic characteristics such as gender, where they live, and education. It studies how people interact with various financial services provided by formal and informal institutions, and the awareness of people and access to those services.
The FII conducted several studies of M-Shwari from 2013 to 2018. According to the FII, which studies demand-side data about financial inclusion, found out that early adopters of the product were especially man and women living in urban areas and with a stable economic situation and a stable job, while from 2014, as we can see from Table 18, the majority of new customers were previously unbanked people living in rural areas and below the poverty line. This shows the impact of M-Shwari on financial inclusion.
Although in 2014 M-Shwari had already a large customer base, more than 10 million, it still had the potential to reach an even larger customer base of financially excluded users.

Figure 18: M-Shwari's user segmentation in 2013 and 2014



Source: InterMedia FII Tracker surveys in Kenya

Another feature of M-Shwari is that digital loans increase privacy. The loans have an impersonal nature, in contrast to loans given by formal and informal infrastructures. Given the privacy of loans, people can avoid inter-personal issues given by a less private loan, such as corruption, social pressure and harassment. Asking a loan to the informal or even informal sector can lead to a situation where a customer was asked for a bribe or any other form of corruption. Instead, M-Shwari gives loans only looking at the credit history of the user, and asks a flat fee to any customers, thus avoiding the possibility of corruption.

"M-Shwari 52 weeks challenge" is a saving program that uses M-Shwari to cultivate the discipline of saving in Kenya. The core is to teach that saving is more effortless as you do it gradually.

Starting week 1 of the year, the customer deposits his savings on M-Shwari with an initial deposit of KSHs.50, then KSHs.100 the next week, KSHs.150 the week after that and so on and so forth, until the last week of the year where the customer will save KSHs.2,600, and his savings will add up to KSHs.68,900. Furthermore, weekly savings lead to the customer loan limit to increase and additionally all deposits on M-Shwari will earn interest of 6% p.a., so the longest you keep your savings, the higher return on interest you get.

Lipa Na M-Pesa, instead, is another Safaricom product that enables customers to purchase goods and services by paying for them via Lipa Na, which works via M-Pesa.
It enables companies to allow users to buy goods and services and to pay bills via M-Pesa and it also enables these companies to receive customer feedbacks through the mSurvey's platform.
Customers can pay for every type of good only if the store applied to Lipa Na M-Pesa. For example, you can pay for groceries from a Minimarket.
Lipa Na M-Pesa is also used to pay for bills. As shown in Figure 17, 35% of M-Pesa customers use it to pay their bills.
In March 2015, 109000 merchants had signed up to Lipa Na M-Pesa (Safaricom.com). Those merchants enable payments via this product by having into their stores a Lipa Na M-Pesa payment point. In the beginning, customers just had to show the message they received to the cashier that proves that the payment has been made. Now, Safaricom has made private these transactions after an upgrade in 2016, which targets 2500 shops with multiple payment points. This change has been done to increase the velocity and the accuracy of the payments, and to increase customer privacy.
Before the upgrade, each shop had a single till, while now shops with more than one payment point have each cashier with distinct till number.
This means that, when a customer wants to choose M-PESA as a method of payment, the shop system will conciliate the amount to the Lipa Na M-PESA payment received, eliminating the need for the customer to show the automatic payment confirmation message.
Lipa Na M-Pesa has always been marketed as fees-free to customers, while merchants have to pay a maximum 0.5% fee for every transaction performed.
Lipa Na M-Pesa has been so successful, especially after the upgrade, that it accounts for more than 50% of M-Pesa revenues.

Furthermore, Fuliza is a M-Pesa value-added product launched in January 2019 by Safaricom and Commercial Bank of Africa. Fuliza allows customers to complete transactions even if they don't have enough money in that money. It is an overdraft facility and the transactions that users can perform using Fuliza are Lipa Na M-Pesa, so pay bills, send money and buy goods and services.
Fuliza now has almost 9 million active customers and has processed KSH 29 billion value of completed transactions in under three months (2019 Safaricom Annual Report).
Customers can repay the outstanding debt just by depositing or by receiving money into the M-Pesa account. Every customer has an overdraft limit, which is based on the transactions profile.

Launched by Safaricom and Kenya Commercial Bank in 2015, KCB M-Pesa is a savings/loan product. It is a product which is very similar to M-Shwari, with the difference that this other financial service has been created with the collaboration of a different commercial bank, KCB. KCB M-PESA has developed the Weka-Weka Savings campaign, which is a promotion aimed at establishing a savings culture using KCB M-Pesa.
The campaign consists of allowing customers to set a savings goal and keep the deposit towards achieving that saving target. The KCB M-PESA platform is very flexible in the way a customer wants to save funds, allowing any user to decide the amount of money he/she wants to save. The customer deposit will earn interest at a 6.3% rate, which can be payable either at the end of the target period or on withdrawing the saved funds.

GE Healthcare is an M-Pesa product that provides loans for small and medium-sized private hospitals to buy medical equipment. M-Pesa has provided its platform to run this service that has been launched by a partnership between the US-based medical equipment manufacturer GE Healthcare and the Medical Credit Fund (MCF). According to their site, GE Healthcare has disbursed via M-Pesa a little less than 3000 loans for a value of over $50 million.
The MCF is a non-profit fund, born in 2009 as a part of the PharmaAccess Group, that provides to the financing of small and medium private hospitals in all the Sub-Saharan countries to provide better healthcare to people living under the poverty line. Their funds can vary from $1000 to a maximum of $2,5 million. This partnership is fundamental for MCF because it gives them the possibility to reach more customers in an easier way, thus increasing the number of loans they provide to small and medium private hospitals.
The loans provided by GE Healthcare can be used by the hospitals to buy equipment, facilities, and staff. Those loans provide the possibility to hospitals to increase their productivity and their organizations, increasing the number of patients, and thus their revenues.
The PharmaAccess Group, of which the MCF is part, is an entrepreneurial firm born in 2001 that uses mobile phones as an instrument to increase the productivity of healthcare especially in the Sub-Saharan countries. This organization started in 2001 to fight against HIV/AIDS by delivering antiretroviral therapies in Africa, while now they are also broadened to make healthcare financing and delivery more inclusive, which means to increase the number of poor customers.
The PharmaAccess Group has created a digital platform that has the potential to connect all the players in the pharmaceutical market. The digitalization could bring higher productivity, could decrease the costs for healthcare for both hospitals and customers, and increases the transparency of the whole process. The founder of PharmaAccess Group has summarized the

company's goals by stating: "*If we can get Coca Cola and beer to every remote corner of Africa, it should not be impossible to do the same with drugs".*

DigiFarm, launched in March 2017, is a product that provides a communication tool between governments and service providers in the agricultural industry, and smallholder farmers. Through this mobile phone-based product, these two big players can interact with small farmers in order to offer them services relating to agricultural that they didn't have access to previously. This M-Pesa is important and is having success because Kenya is a country where agriculture is the largest single employer in the country, with almost 60% of the employed population working on this industry. Furthermore, 60% of the Kenyan population lives in rural areas (FinAccess Survey 2019).

M-Pesa noticed a gap, as the agricultural sector contributes to only 30% of the Kenyan GDP. This is because most of the farmers have a very small size and make a small profit also because they don't have access to multiple government services that could boost their productivity. DigiFarm aims to close the gap between the 60% employment rate and 30% of contribution to the GDP by connecting small farmers and the Kenyan government.

The services that small farmers now have access to via DigiFarm vary from discounted inputs to advise on which are the best farming practices. Farmers can also apply for loans that serve to invest in their activities, buying equipment or inputs.

From the 2018 Safaricom Business Report, DigiFarm now has more than 700000 farmers that opened an account. Of these accounts, over 200 of them use DigiFarm daily, and over 7000 successfully got a loan.

2.5 Financial Literacy and Digital Financial Literacy

Financial literacy is defined as the correct understanding and education of a wide range of basic financial topics, from the management of the user's personal finances to investment decisions. Users need to know how to manage their personal finances in an efficient way in order to be financially literate and need to be able to understand basic concepts like tax planning, retirement, and paying any fee.

Financial literacy is essential to be certain that the services used to increase financial inclusion work positively. For example, microfinance is a very effective tool to increase financial inclusion, but if poor people get a loan without understanding how it works and how they have to repay the interests, it is possible that they don't repay it, bringing debt problems that can be very harmful to individuals.

Furthermore, financial literacy is a problem present in both developed and developing countries. In the first case, people lack a clear understanding of some financial and banking services because these products are becoming more difficult every day. In the last twenty years, with the penetration of the internet in the financial sector, there are financial services that are complex and if used badly, they can lead to bankruptcy. For example, thanks to the digitalization of the financial sector, these days any individual can trade with online trading platforms. Trading has a very high risk given by high volatility of the markets, due to difficult moments that the global economy is suffering. Because of this, people can easily buy or sell the wrong stocks and lose all their investment if they weren't enough informed, thus they lacked financial literacy.

Moreover, people living in developed countries need financial education to achieve a dignified life after retirement. This can be achieved only if individuals didn't take any poor investing decisions that turned to decrease his overall wealth, and if they followed a simple but efficient pension plan throughout the years.
In the United States, the government created in 2003 the "Financial Literacy and Education Commission", which coordinates the education efforts of the government, and it promotes financial education efforts from the private sector. The main goal is to provide information to people who want to learn more about finance and the financial industry. The commission also organizes free counseling with a financial expert to anyone who applies.
Financial education, if well managed, leads people to become financially self-sufficient, which very likely brings financial stability of the individual.

In developing countries, financial literacy is one of the most important tools to decrease poverty and increase financial inclusion. The concept is backed by the idea that you have to teach to somebody how to use a product that is made available to them. In order to have the "common man" to be wise and use efficiently financial and banking services, and to protect him/her from taking harmful decisions, he/she has to be informed about the risks of the services and the best and most efficient ways to use them.
Developing countries' main problem related to financial education is the lack of information about saving, which is one of the most important and effective tools to decrease poverty. The limit of banking products that promote financial inclusion is that they give the possibility to people to have access to saving products, without bothering if these people were able to use them and understood all the related risks with saving. People lack a deep understanding of how important is saving to reach a life over the poverty line, to increase the resilience to income shocks, and to manage their present and future consumptions.

Other than financial literacy, there is digital financial literacy, which still employs energies to increase the overall level of financial education, but with a focus on digital financial and banking goods and services. Fintech companies increased the level of access to financial services, but to correctly and efficiently use them people require a higher level of financial literacy. Those services are more complicated to understand relative to traditional ones because these new services have more risks related to them. Being digitalized, these services bring new risks that people must be familiar to if they want to manage their wealth correctly. Those new risks are, for example, phishing, which is the risk of encountering a hacker which pretends to be a financial institution to ask the user to divulgate personal sensible information.

CONCLUSIONS

This thesis explores innovation in payment systems in the last twenty years, focusing on a very successful case active in Sub-Saharan countries, that showed how mobile payment systems could have a positive impact on the poor's lives and a developing country's GDP: the extraordinary case of M-Pesa.

M-Pesa is a mobile payment system launched in Kenya in 2007 by Safaricom, a company owned by Vodafone. Since its inception, M-Pesa had great success, with more than 10 million active customers in three years. Today, M-Pesa has 28 million customers in Kenya only, and it accounts for more than 40% of Safaricom's revenues. This high share of Safaricom's revenues mirrors M-Pesa success, as it is a system that performs especially low-value transactions and charges small fixed transaction fees.

M-Pesa provides to customers a wide range of services, and it implemented the variety during the years by adding new products by having partnerships mostly with commercial banks.

The basic transactions that can be performed via M-Pesa are three: the first, and the most important is person-to-person (P2P), which enables customers to send money to users and non-users via mobile phone. It is the most used M-Pesa service, as it is used for remittance. Kenya is a country where cities and rural areas are not connected properly. Cities are richer than rural areas and people move from these areas in order to find a stable job and seek for a better economic life. Kenya is also a country where people are "culturally" bounded to their families also when they move to cities. Families expect remittance from these people if they find a stable job, and the majority of families in poor rural areas need remittance in order to perform day-to-day transactions. Before the launch of M-Pesa, both formal and informal remittance services were far from being efficient: these services were expensive, insecure, and most of the times it

would take days for the money to go from cities to rural areas and vice versa. Formal services, like Western Union and service from commercial banks, were the most expensive services and, as shown in Figure 8, they were the least used by the Kenyan population, with less than 20% of the market share. Instead, informal services accounted for more than 60% of the market and were run mainly by bus companies. People had to go to a bus terminal and hand over a package to the driver. The receiver had to go to the nearest bus terminal to pick up the money.

The other two basic transactions that users can perform via M-Pesa are cash-in and cash-out transactions. Users in need to exchange cash or in need of cash can go to an outlet and perform the transaction. M-Pesa has been used since its launch as a safe storage of money because it has been the first service to provide the possibility to exchange cash for electronic money. Before M-Pesa, the unbanked population had to store their savings in hidden places, but with a high risk of loss or thief.

These two transactions are performed at an agent outlet, which is "a human ATM". These agents exchange cash for e-money and vice versa with M-Pesa customers. Agents are retail outlets that act as mobile money retailers, and they are the backbones of M-Pesa as they are responsible for cash-in and cash-out transactions and for the whole registration process of new customers. The process is fast and relatively easy, especially compared with the process for opening a bank account at a commercial bank. People need a national ID and to sign a few documents, create a personal PIN, and have a mobile phone with a compatible SIM, which is provided for free by Safaricom.

M-Pesa is used for other services, mostly microfinance-related products, purchase of air time, payment of bills and fees, and other financial services.

Most of these new services are performed via M-Pesa value-added products. As shown in paragraph 2.4, M-Pesa is providing its customers with a very wide range of products. For example, M-Shwari is the most used value-added product and it is a bank account that can be opened and managed via M-Pesa. The product has been launched by Safaricom and the Commercial Bank of Africa and it provides the possibility to people to earn interests on their deposits. The service's main goal is to permit people to save money without losing their values due to the unstable inflation in Kenya, which only ten years ago was around 25%, while in the last year it has varied between 5% and 10% (Tradingeconomics.com).

M-Pesa also provides a value-added product that empowers the payment of bills, school fees and in-store purchases of goods and services which is called Lipa Na M-Pesa.

Furthermore, M-Pesa has recently added an overdraft facility called Fuliza. The product provides the possibility to perform transactions even if the customer doesn't have enough money.

M-Pesa found in Kenya the perfect environment for its stunning growth and for its success, which in fact wasn't reproduced in other countries with different environments.
First of all, Vodafone, with its controlled African branch Safaricom, was already present in the mobile provider market, with more than 80% of the Kenyan market share in 2007, and more than 65% of the market in 2017, as shown in Figure 7. This is very important because Safaricom already had cellular towers and servers to run M-Pesa. Then, it has been for the last twenty years a very famous brand that people knew and trusted.
Furthermore, Safaricom has been helped to implement M-Pesa by a supportive Kenyan Regulator, which assisted Safaricom through the complex regulations that require cooperation with financial and telecommunication regulators. Safaricom was also able to implement M-Pesa thanks to the decision of the Kenyan Regulator to permit Safaricom to realize this project without being regulated as a commercial bank even if M-Pesa offers financial services.
Another reason that brought the success was that M-Pesa provided an efficient tool to meet a large latent demand for remittance. Furthermore, M-Pesa provided a service that offers the exchange of e-money and the management of e-wallets.
Additionally, M-Pesa's success derived from an effective marketing campaign. Safaricom organized a full-scale nationwide launch, with posters and flyers on the streets, and promotions like discounts on airtime to encourage registrations. Moreover, M-Pesa also chose a very naïve but impressive slogan: "Send Money Home", which endorses M-Pesa's main goals in the simplest way possible; people understood easily how M-Pesa could be used for remittance.

M-Pesa had a huge impact on the Kenyan economy and on the population. It is a service that, without having to deal with commercial banks that Kenyan at that time didn't trust, enables users to use basic financial services, thus making them financially included. As shown in paragraph 2.3, M-Pesa has had a tremendous effect on the level of financial inclusion in Kenya.

Figure 16 shows that in 2006, one year before the M-Pesa launch, 41% of the adult population in Kenya was financially excluded, thus almost half of Kenyans didn't have access to basic financial services. As in 2019, only 11% of the Kenyan adult population is financially excluded. Of the financially included ones, 98% of them have an account with a mobile payment provider. Financial inclusion is globally well-known as one of the most efficient tools to decrease world poverty and hunger. That's why the United Nations General Assembly created the 2030 Agenda for Sustainable Development, which is formed by 17 Sustainable Development Goals (SDGs). These goals aim to decrease poverty and hunger, to increase the quality of life in all its aspects, to create sustainable businesses for a sustainable world, to fight climate change and to bring education in all the areas of the world.

Without being explicitly named, an increase in the level of financial inclusion is essential if the United Nations want to achieve most of these ambitious goals.

Furthermore, innovations that benefit people, especially the ones living under the poverty line, by enabling them to use financial and banking services are crucial to fight world hunger and poverty. These services make people more resilient to internal and external income shocks by giving access to credit and saving facilities, and they offer more convenient services than the ones offered by the informal sector. The digitalization of these services drastically reduces the costs that commercial banks and mobile providers incur to provide the service. This enables them to provide services at a lower cost and gives them the possibility to expand their customer base by providing these services in poor rural areas. Microfinance is also a cost-effective service especially if the overall process is digitalized. Microcredit enables people to take loans and be able to repay them. It is essential for people to have access to microfinance as it gives them the possibility to fulfill their short-term need for liquidity.

All these tools that bring financial inclusion have one common feature that can alter their effectiveness: they can be very complicated and new technologies, although making them less expensive, are making them also more and more complicated. Being very complicated sometimes, they also bring different risks, especially if people don't fully understand these risks, thus underestimating their danger. For example, microcredit has been globally recognized as a very powerful tool that brings financial inclusion and can push people to become entrepreneurs and can thus increase their income.

But it can happen that, if people don't use financial services property, services like microfinance can bring various downsides, such as indebtedness and be excluded from microcredit for many years due to bad credit history.

The only way to avoid downsides of financial services, especially in developing countries, is to create an enabling environment for financial literacy, which is the understanding of basic financial and banking products and services, such as managing personal finance or managing taxes and planning retirements. Financial literacy enables people to use financial services correctly and more efficiently, thus increasing the effectiveness of financial inclusion and avoiding drawbacks.

Financial education is being targeted globally by all countries after having understood its importance. Governments must support people in the understanding of financial services by providing them with instruments that the population can use to increase their financial

education. Countries all across the world are working on rules and laws that, if implemented, could increase financial literacy with the aim of increasing the effectiveness of financial inclusion. Governments must thus create financial literacy strategies which must, according to the study "Financial Literacy and Financial Inclusion" of R. Ramachandran, ensure different partnerships, must focus on a limited number of goals and follow specific steps to reach them, and must target specific groups more in need, like young people and minorities.
Developing countries are also creating governmental bodies that are developing tools to increase financial inclusion and are overviewing the levels of education in the country. For example, the US Financial Literacy and Education Commission (FLEC) created the website "MyMoney.gov" which is a financial education site that people can use if they need help or want to increase the quality of their education.

In conclusion, financial literacy is essential to support the global financial system, to help poor people in developing countries, and to ensure financial stability in developed countries. The Sustainable Development Goals need a boost in financial education globally, as it would render all the efforts made more effective and powerful. Financial education is essential to ensure correct use of financial services and to increase the demand for those, since that if people are able to correctly understand the services, they will be more inclined to use them in their financial every-day lives.

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