March 2020

Pay on Demand: The digital path to financial inclusion in Africa

mastercard

FOREWORD

A global commitment to expanding financial inclusion

The notion of ownership is undergoing a shift in today's world. Consumers no longer own the music they listen to. Ride-sharing has ensured that car ownership is no longer essential for mobility. The sharing economy, underpinned by the technologies of the Internet of Things (IoT), has made it possible to bridge the ownership divide and bring products and services to individuals in smaller, shared packets as and when they are needed.

Bridging the digital divide is essential to enabling financial inclusion. Digital inclusion, often powered by the connected devices, has been proven to help pave the path for individuals to access financial and other services that can prove to be life-changing in more ways than one.

Digital exclusion, on the other hand, leaves individuals disconnected from the social, economic and financial systems that can make them more productive by giving them access to services that many take for granted – such as electricity, clean water, refrigeration, information, education or finance.

Close to a third of adults globally – 1.7 billion – are still unbanked, which means that they don't have access to a financial account. About half of unbanked people include women in poor households in rural areas or those who are out of the workforce. For these individuals, being a part of a financial system means being able to access and afford products and services that would be denied to them if they were to rely entirely on cash.

Through our financial inclusion initiatives, Mastercard's focus has been on resolving the real pain points of individuals in Africa across sectors that include agriculture, education, the FMCG supply chain and healthcare.

Pay on Demand business models are emerging around the world to give people the ability to pay for what they use, as and when they need it, in small increments – whether it is electricity powered by solar energy, clean water, or education. At the same time, providers feel empowered with control over their services remotely, and are able to lend confidently.

With a Pay on Demand digital solution, individuals are able to build a credible payment history, which can help them plan and connect to other financial services, such as credit, loans and insurance. Used ethically, data becomes a key enabler to drive inclusion and protect the consumer. This is our way of ensuring that financial inclusion reaches where it can make a difference, where it makes it possible for individuals to climb out of debilitating poverty and prosper.

The mobile device has become a viable instrument of inclusion ever since prepaid plans have enabled individuals to recharge for as low as 10¢ at a time.

It may mean the difference between being able to switch on an electric light in your house, as opposed to living with paraffin fumes from a single lamp that services all the rooms. For children, it can mean up to an hour of additional study time each day after the sun sets.

"We are discovering that by deploying solutions in a focused, market-specific manner, we can use connectivity and smart devices to promote inclusion via payments innovation."

We are discovering that by deploying solutions in a focused, market-specific manner, we can use connectivity and smart devices to promote inclusion via payments innovation. This report examines the impact that Pay on Demand has on the end-users who may be making small payments daily to realize the benefits of products and services such as electricity, smartphones and televisions – things that many of us probably take for granted.

At Mastercard, we know that it takes a village, and we are privileged to work with financial institutions, mobile network operators and equipment manufacturers who share our vision and commitment to making a difference. We also ensure that we listen effectively to what our customers, the end-users of products and services, are saying. This helps us to continue innovating to make payments easier and achieve our 2020 goal of reaching 500 million people hitherto excluded from financial services.

Together, we are committed to making prosperity possible for all.

Jorn Lambert
Executive Vice President, Digital Solutions

INTRODUCTION

Financial inclusion in Africa makes sense for everyone. For end-users this means being able to access products and services that would be out of reach otherwise. For the private sector, the future of business depends on being able to develop solutions that are relevant to the underserved market.

Sharack, a farmer in Kenya, uses the solar television he has acquired via Pay on Demand to keep up with agricultural news from his area and around the world. Ezekiel, another farmer, says the solar light has made a vital difference. "At home there is no electricity for miles and miles around. The darkness was a problem, especially during the rainy season when hyenas would steal our animals from our homes. But not anymore. The light has really helped."

In the case of Sub-Saharan Africa (SSA), where cash dominates the sectors that drive the economy – agriculture, tourism and micro, small and medium-sized enterprises (MSMEs) – digital inclusion means enabling access to economic growth. According to the International Finance Corporation, 65 million enterprises, or 40% of formal MSMEs in developing countries, have an unmet financing need of $5.2 trillion every year. In SSA, which has 44 million MSMEs, 97% are micro enterprises. As smallholder farmers or as workers, women are a significant part of this ecosystem. [1]

A commitment to the growth of Africa means finding a way for digital inclusion to reach this population. Bridging the digital divide has proven to be a way to connect people to the larger world, with greater opportunities, in small increments. Millions of Africans have got around unpredictable payments and erratic income patterns by buying what they can, when they can, when they need it. It is not unusual for a casual worker to buy 10 grams of sugar, or 100 milliliters of oil in a sachet, or for his daughter to buy a pack of two biscuits.

A consumer-centric solution for this challenge has been instrumental in finding a growth path in Africa by empowering people to buy products and services – like mobile phone air time – in micro amounts as small as 10¢ in Nigeria, for instance. Making payments in small installments is a need addressed by many industries from FMCG companies to mobile telecom providers, with a simple message: Pay only for what you need.

In Uganda, Kupaa, a Mastercard mobile payment platform launched in partnership with UNICEF and Uganda's Ministry of Education, allows parents to pay remotely in installments on a phone, and it enables schools to keep track of those payments, so that the child does not miss school because the parent does not find it possible to pay fees in a lump sum. The idea is to match the channel, time and amount of payment to customer needs. [2]

"As a security officer, I felt ashamed that I don't have money. Now, people see me with this phone they think is expensive, I feel like someone of status and working class," says Mathias, a security officer in Uganda.

Pay on Demand embraces the power of small parcels in Africa, building on the success of mobile money to make more opportunities possible. This is why it has proven to be an effective way to include many of the 1.7 billion adults globally that remain unbanked and excluded from the global mainstream financial system. [3]

Pay on Demand users are connected with products and services that improve their daily lives and add value to their business and home. At the same time, private, public and civil sector entities are adopting new ways of reaching them. Technology has given us a way to combine the low-cost Internet of Things (IoT) with seamless digital payments.

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Morakinyo, a mother of four and a fashion designer in Nigeria, says: "My children like to watch Nickelodeon. The solar home set allows me to keep my children inside and keep them occupied watching TV once they finish their homework."

Add to this new business models like Pay on Demand and it spells access to previously inaccessible consumers, with capital-intensive products that enrich their everyday lives even as they add to their general credit-worthiness by building financial histories.

The broader Africa doesn't have credit bureaus. This forces most people to approach private money lenders for their growth needs. Pay on Demand creates a model that converts unsecured lending into secured lending; that is at the heart of its solution.

The initial access to financial services is the first step on the road to prosperity, a step into the world that they knew was out there, but was out of their reach – until now. Their health is better from not being exposed to pollution from paraffin lamps, and from working with light from solar panels. Pay on Demand can power micro lessons in the educational sector via distance learning, arming candidates with certifications for jobs.

Between January and June 2019, 4.11 million solar lanterns, multi-light and solar home systems were sold, along with 730,000 off-grid solar appliances. The life-changing impact of off-grid solar has reached 280 million people since July 2010 [4].

As the Pay on Demand model scales, more consumers will gain access to useful products that support happier, healthier lives as well as financial services to secure their future.

This report is based on in-depth, face-to-face interviews in Kenya, Nigeria and Uganda to understand the ground-level impact on lives and livelihoods, health and safety. Unexpectedly, we were touched by the emotional benefits that switching on a light can bring, or the dignity that comes from having a phone that is always charged.

With this feedback, Pay on Demand providers such as smartphone and solar panel original equipment manufacturers (OEMs) can enhance services to consumers and communities that materially improve their lives.

Mastercard believes that our partnerships with Pay on Demand providers, in their pursuit to unlock opportunities in underserved communities, can help drive the new wave of financial inclusion. In this paper, we explore the potential of Pay on Demand and IoT to drive that new wave of inclusion, and how Mastercard and our partners on this journey play a role.

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THEME ONE

The impact of connected devices on economic activity

Affordability and Pay on Demand are key enablers of financial inclusion for more and more people

Mobile phones have long been considered vehicles of inclusion and development in SSA, as they connect individuals to peers, information, markets and services, bridging urban-rural and rich-poor divides.

The paucity of infrastructure such as roads or electric power has underlined the role of the smartphone as a service delivery platform that not only reduces communication and coordination costs but also transforms lives through innovative applications and services. [5]

About 45% of people in the SSA region own a mobile phone, but subscription to mobile services is growing at a compound annual growth rate (CAGR) of 4.6%, one of the fastest in the world. At the end of 2018, there were 456 million unique mobile subscribers in SSA, an increase of 20 million over the previous year. Around 239 million people, equivalent to 23% of the population, also use mobile internet

on a regular basis. By 2025, the total subscriber base will reach more than 600 million, representing around half the population. [6]

However, the region still lags the global average in ownership of both feature phones and smartphones. Across the world, 67 of every 100 people have a mobile subscription, and 60 of every 100 own a smartphone. In SSA, 45 of every 100 people have a mobile subscription, and only 36 own a smartphone. [7]

Smartphone and feature phone adoption is the focus of many government and private sector initiatives. One of the most recent is the planned KaiOS initiative, which is being supported by the region's telecom operators. Retailing for $21, the phone, offered as an "affordable smart feature phone", supports 3G+4G/LTE, Wi-Fi, GPS and Hotspot, and enables users to access apps such as WhatsApp, Google Assistant and Facebook. [8]

$2bn

productivity boost expected in Sub-Saharan Africa by 2025 if IoT adoption doubles

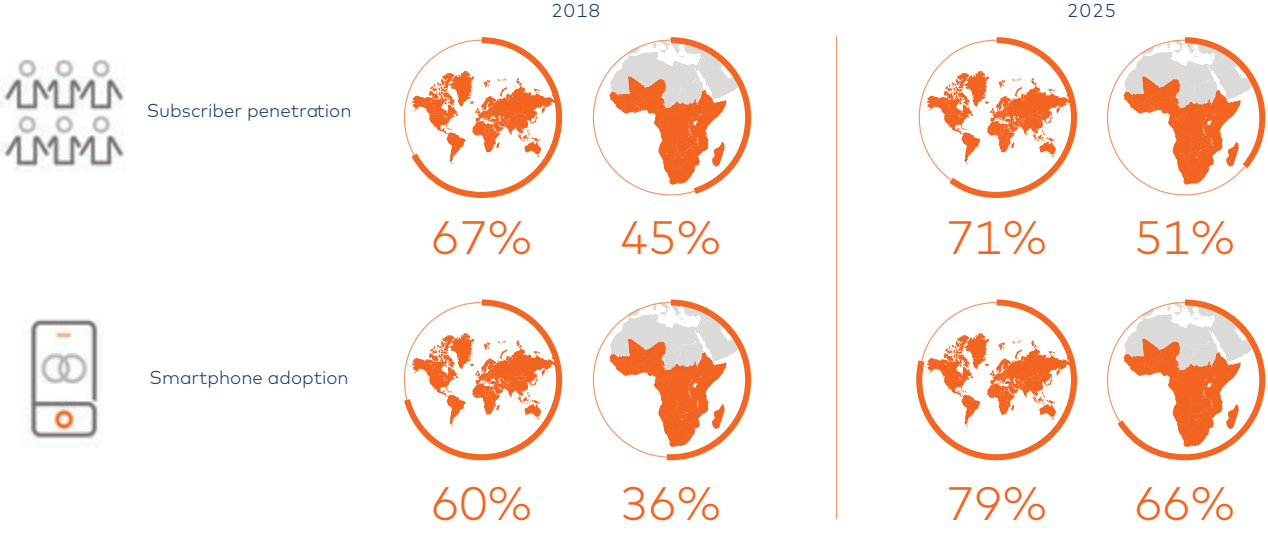
At the same time, several countries have been witnessing a marked increase in network deployment over the past 12 months. Seven LTE networks have been launched in the region since the start of 2019, including in Ghana and Burkina Faso. 4G adoption is expected to overtake 2G in 2023 and account for 23% of connections by 2025. [5]

Loon, a sister company of Google, is bypassing the infrastructure challenge by building a network of high-flying, solar-powered balloons to connect people in rural Kenya to the internet. In December 2019, it signed an airspace access agreement with Uganda, to provide floating balloon-enabled internet services in neighboring Kenya. [9]

Research has forecast that if IoT adoption doubles in SSA, productivity will get a $2 billion boost by 2025.

Worldwide, industrial IoT will lead overall growth, at a CAGR of 21% between 2017 and 2025. As a result, IoT connections for industry – at 14 billion – will account for more than half of total connections.

Mobile penetration and smartphone adoption – Africa vs. the world



Source: The Mobile Economy 2019, GSM Association.

Barriers to the growth of internet access

However, there are still barriers to internet access that need to be overcome to realize the massive opportunity that the SSA region represents. One is the slower speed of internet data in Africa compared to other continents.

The number of smartphone connections in the region reached 302 million in 2018 and are expected to rise to nearly 700 million by 2025. Still, SSA lags other regions in 4G adoption, which accounted for 7% of total connections in 2018, compared to the global average of 44%.

10¢

is the smallest top-up amount for pre-paid phones in Nigeria

Factors such as the high cost of 4G-enabled devices and delays in assigning 4G spectrum to established service providers have been responsible for low adoption of 4G. [6]

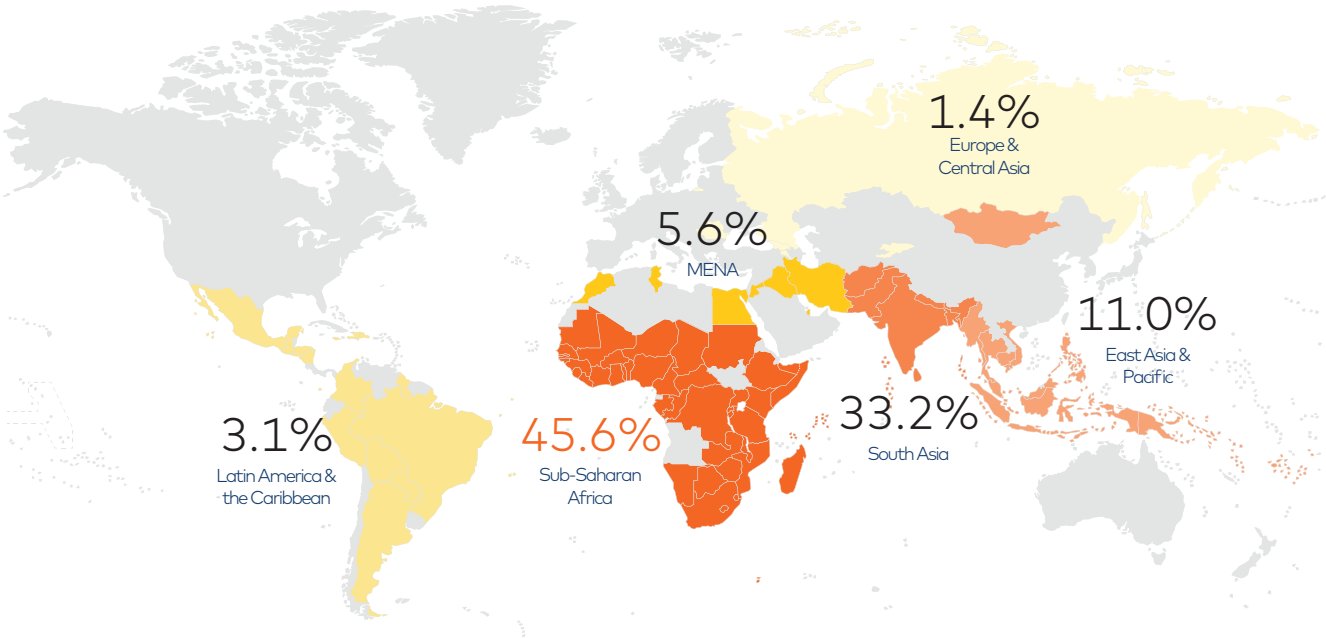
Along with speed, affordability and availability of internet, access also affects use. Across Africa, the average cost for 1GB data is 7.12% of the average monthly salary. In some countries on the continent, 1GB costs as much as 20% of the average salary, which puts it out of reach of all but the wealthiest few. Comparatively speaking, if a US household wage-earner paid 7.12% of their income for 1GB, they would be paying as much as $373! [10]

Increasing economic value

The mobile ecosystem adds to the economy directly and indirectly, contributing overall economic value. In 2018, mobile technologies and services generated 8.6% of GDP in SSA, amounting to $144.1 billion of economic value.

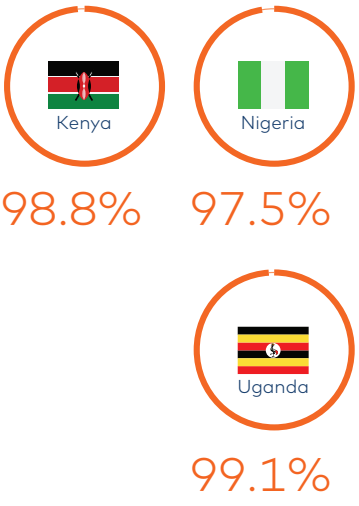
The mobile ecosystem was directly and indirectly responsible for almost 3.5 million jobs and contributed almost $15.6 billion via taxation to the public sector.

Global spread of registered mobile money customers, December 2018



Source: State of the Industry Report on Mobile Money, 2018. GSM Association.

Pre-paid connections



Source: Africa Mobile Observatory 2011, GSM Association.

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By 2023, the mobile economy – resulting from the economic impact of mobile communications on consumers, businesses and nations – is expected to reach almost $185 billion (9.1% of GDP) as countries increasingly benefit from the improvements in productivity and efficiency brought by the expanding adoption of mobile services. A large part of this is within the informal economy. Almost 1.2 million of the 1.7 million directly employed by the mobile ecosystem are informally employed in the distribution and retail of mobile services. [6]

Africa also accounts for as much as 45.6% of mobile money activity in the world — with a transaction value of $26.8 billion 2018, excluding bank operated solutions. [11]

The digital economy, powered by connected devices such as smartphones, is also having an impact on Africa's traditionally dominant gig economy, locally known as *jua kali*, or the informal sector, which remains a major job creator in many countries, including Kenya.

According to the 2019 Economic Survey by the Kenya National Bureau of Statistics, the informal sector was responsible for 762,100 of the 840,600 new jobs created in 2018. [12]

Start-ups are using digital technology to fill talent and service gaps. Andela, for example, trains African software engineers at its campuses in Nigeria, Kenya and Uganda, before placing them as part of "distributed teams" to companies in Africa and globally. [13]

Globally, platforms such as Uber and Airbnb, which connect multiple users across geographies on connected devices, have led to the rise of the gig economy with workers opting for flexible gig work instead of formal contracted employment. In China, Alibaba offers a sales channel to millions of participating small and medium-sized businesses. In Africa, Lynk matches thousands of jobs – in categories ranging from plumbing and electrical work to yoga lessons and hair care – to customers and providers. In keeping with the requirements that may be unique to Africa, it also invests in onboarding and up-skilling its members, reporting a two-

to three-fold increase in monthly income for participating workers. It also provides them with services such as logistics and warehousing support, material wholesaling and ongoing skill training. [14]

Cars45, a Nigerian online platform for buying and selling used cars, logistics start-up Kobo365, and Kenya's Twiga Foods are all examples of this new take on the gig economy. The gig economy is considered a new concept in developed markets, but has been a crucial employment generator in developing economies for decades. Strengthening the digital sector contributes to a more equitable growth of the gig economy. [13.]

Access to a mobile phone paves the way for participation in the wider e-commerce network, which relies on entrepreneurship and innovation. There is massive unmet demand for goods and services in Africa with as many as 60,000 people per formal retail outlet, compared to 400 people per store in the United States. Estimates put private consumption on a growth trajectory – from $860 billion in 2008 to $1.4 trillion in 2015 – significantly higher than that of India, which has a similar population size. It is forecast to reach $2.1 trillion by 2025.

In 2019, African e-commerce platform Jumia was listed on the New York Stock Exchange. Jumia has more than 4 million customers in 14 African countries and is celebrated as Africa's first technology unicorn. It estimates that online sales are less than 1% of total retail sales in Africa, compared to 24% in China, for instance. [15]

In spite of smartphones and feature phones being crucial growth engines in Africe, one of the big barriers to owning one is affordability. Africa's total mobile phone market reached 55.8 million units in the third quarter of 2019, with feature phones commanding a large share (59.4%) and smartphones at 40.6%.

Factors that have contributed to this growth include an influx of affordable models that have recently been launched. It is clear that people want phones that pack a lot of benefits. From a price-band perspective, the

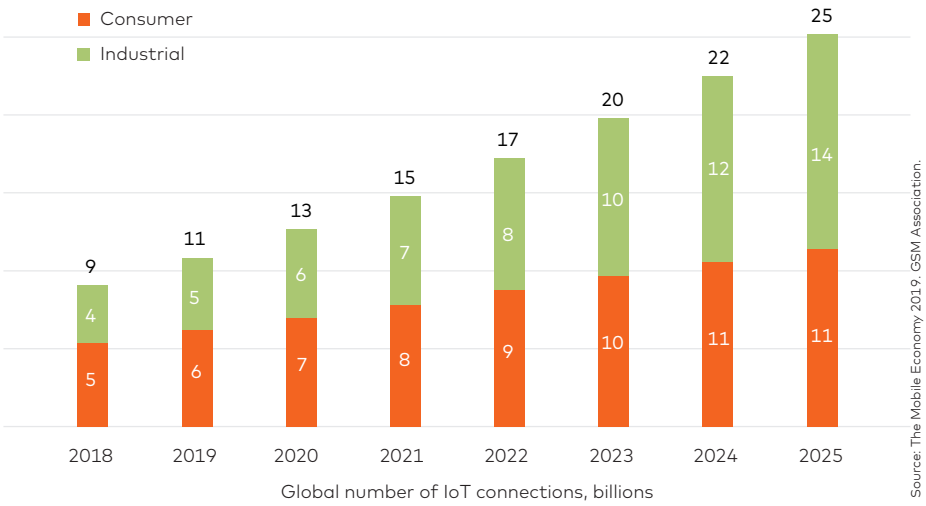
The opportunity for payment digitization by sector in Kenya

	Agriculture	Transportation	Food & Beverage	Utilities	Taxation	Education
Headline finding	Cash-based value chain and credit limitations stall productivity.	Digitizing payments will be challenging given misalignment of actor incentives	Trending towards formalization and foreign entrants, ripe for digitized payments	Digitized payments are scaling in tandem with rapid electrification	The iTax digital system still results in primarily cash Payments	As more students enroll in private schools, digital payments optimize fees
Opportunity size	33% of GDP	70% of people use matatus	43% of household consumption	GoK** goal: 100% by 2020	$7B missed in revenue collection	11% of expenditure for rural houses
TAM* at 2021 end	$20.47 billion	$1.67 billion	$19.71 billion	$2.3 billion	$25.27 billion	$1.87 billion
Cash payments	~93%	>99%	~95%	~40%	~82%	~41%
CAGR 2016-2021	4.6%	5.7%	13.4%	8%	~5%	6.4%

* Total addressable market ** Government of Kenya

Source: Mapping Financial Flows in Sub-Saharan Africa, A Collaborative Research Initiative between Mastercard & The Fletcher School, February 8, 2018

IoT connections to grow to 25 billion by 2025



Source: The Mobile Economy 2019, GSM Association.

600mn

is the forecast size of Africa's working-age population by 2030

$100-$200 category saw its share of shipments increase from 31.4% in Q3 2018 to 39.8% in Q3 2019. However, the ultra-low-end band (below $100) has been declining in recent quarters as brands start offering affordable devices with larger screen sizes and 4G capability. [16]

Even so, owning a mobile phone is only half the battle with people in rural areas sometimes having to travel to another town in order to charge the phone, or using paid charging stations that may cost as much as 25¢ per use. [17]

The power of 4IR technologies

The growth of digital technologies is associated with empowering the poor with access to information, job opportunities and services that improve their standard of living.

Artificial intelligence (AI), robotics, IoT and blockchain hold the potential of utilizing technology for data gathering and analysis that can deliver more targeted and effective strategies aimed at poverty reduction.

Africa has been a use case for the transformational power of formal financial services through mobile phones, or mobile money. Its impact on the underserved, including women, who are important drivers for sustainable poverty eradication, is well proven. These financial services unlock benefits that include saving in secure instruments to enlarge their asset base and escape poverty. [18]

By 2030, Africa is expected to hold the world's largest potential workforce. According to the Human Capital Index by the World Economic Forum, SSA currently only captures 55% of its human capital potential, compared to a global average of 65%.

With more than 60% of its population under the age of 25, SSA is the world's youngest region. The continent's working-age population is set to increase by two-thirds, from 370 million adults in 2010 to over 600 million in 2030. [19]

The Fourth Industrial Revolution (4IR) is expected to generate focused growth in everything from infrastructure to skills for innovation and technology. Already there is evidence that Africa's working population is becoming better educated and prepared to seize the opportunities provided by 4IR. For instance, the share of workers with at least a secondary education is set to increase from 36% in 2010 to 52% in 2030. [19]

There are already examples of how these technologies are being used innovatively to enable improved services. In West Africa and Kenya, for example, blockchain has enabled efficient verification of property records and transactions, with private registries enabling more transparency. [20]

762k

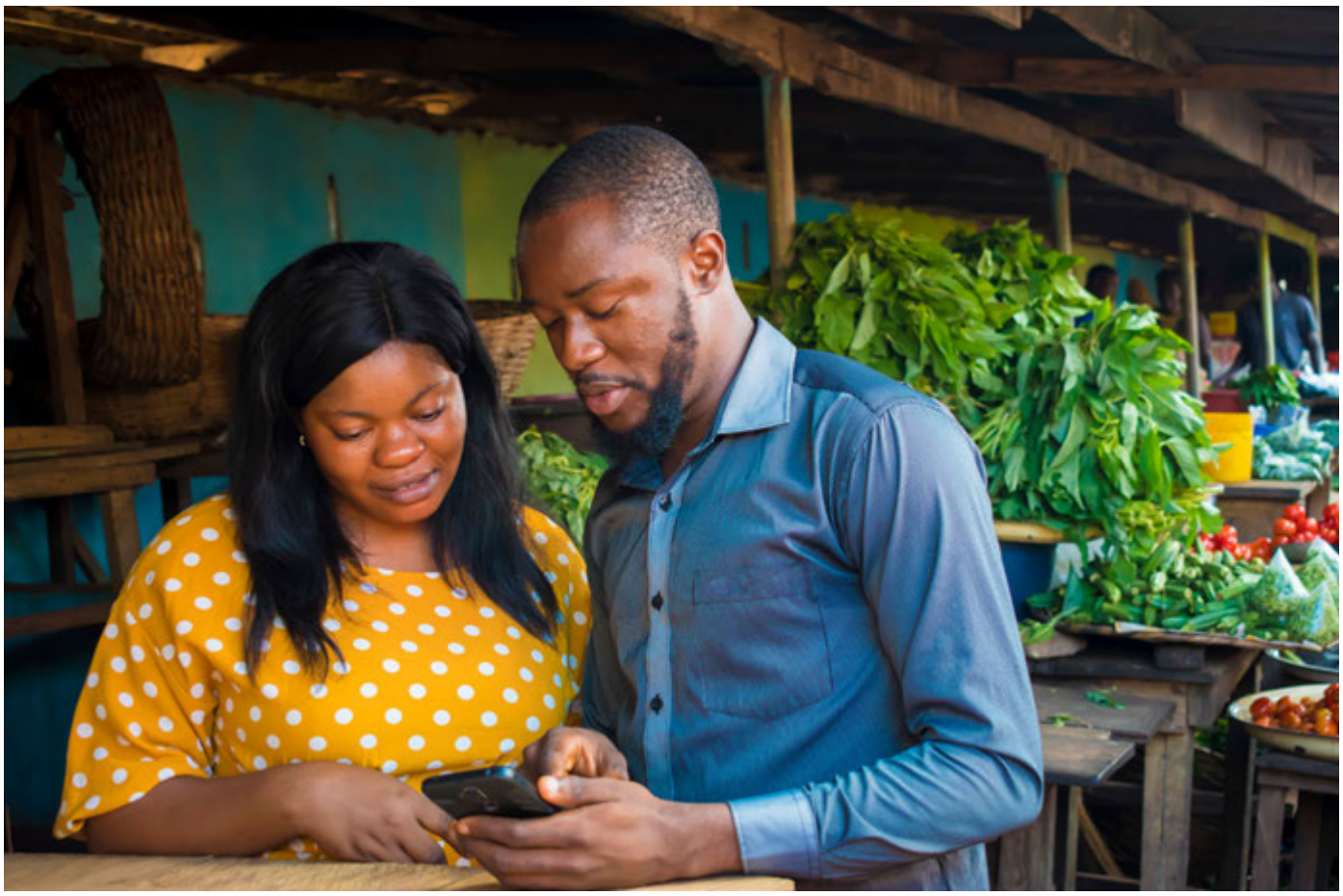
of the 840,600 new jobs created in 2018 in Kenya came out of the informal sector

Liquid Telecom Kenya has deployed an IoT network in western Kenya and Nyanza Province to monitor and protect freshwater fish populations. Ten pilot-phase sensors are in place to monitor water temperature and pH values in ponds. The sensors send information and feeding instructions to farmers through an Android and iOS app. The initiative plans to equip 5,000 farmers with the sensors and app by the end of 2019. There are some 20,000 fish farmers in western Kenya with an average of two ponds each and around 2,400 fish per pond. The program aims to help increase fish production. [21]

Water-metering projects are also seeing the impact of IoT. A project launched in 2013 by the University of Oxford started with a 12-month smart hand pump trial in Kyuso town in Kitui County, Kenya. The project had the goal of resolving the problem of water pumps breaking down constantly. In another project supported by UNICEF in Kwale County in southeast Kenya, research is under way to determine how data from accelerometers can be used to determine the depth of the water beneath the pump, in order to monitor the condition of the pump. An accurate breakdown prediction can be made before the pump actually stops working. In Nigeria, CityTaps uses an IoT solution by installing smart Pay on Demand water meters that help monitor the exact amount of water used. [22]

Across Africa and other parts of the world, the Mastercard Lab for Financial Inclusion offers products in three key areas: Mastercard Farmer Network (MFN) in agriculture; Kionect in micro-retail; and Kupaa in education. The products are created across nine innovation hubs in New York, Miami, St. Louis, Silicon Valley, Dublin, Nairobi, Singapore, Pune and Sydney. [23]

Clearly, solutions supported by technology can be life-changing in more ways than anticipated. The law of unexpected consequences seems to work in their favor.



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THEME TWO

Connected devices are changing the game for consumers and small business

Pay on Demand is bringing the benefits of new technologies to businesses and consumers equally

With innovative service delivery at its heart, Pay on Demand providers such as solar panel and smartphone OEMs have been operating since the late 2000s in Africa.

Based on the lease-to-own model, a consumer who cannot afford to pay for an asset outright pays a provider in regular, small installments using a Pay on Demand scheme. [24]

A consumer pays until they directly own the asset, or until they stop needing it (or stop being able to afford it), and the asset is returned to the provider.

In the solar home industry, this model has improved affordability and access to off-grid electricity for underserved communities. One of the

indirect benefits of Pay on Demand is that it helps establish a digital transaction history, making it possible for the consumer to obtain other credit and financing solutions.

Pairing digital payments with IoT technology transforms Pay on Demand providers from retailers and distributors to financial service providers. In the absence of a financial history, Pay on Demand providers enable internal credit risk models for new customers on smart devices like solar panels or cooking gas or smartphone, leveraging the capability of locking the device remotely using IoT technology. This is a valuable contribution in an ecosystem where traditional risk models based on data are not possible in the absence of any available analysis of behavioral, consumption and employment-related data.

Many Pay on Demand providers share their credit models with credit agencies in the countries where they are present, paving the way for customers to build relationships with formal financial institutions.

Additionally, customers can also access other financial or consumer products outside the core offerings of their Pay on Demand provider. While solar electricity is a foundational component, other products and services can add to the economic stack, thus improving daily life and economic outlook.

These products and services include assets such as solar lanterns, grid components, mobile phones and agricultural equipment. Being a part of Pay on Demand can directly impact a customer's income generation capability by adding hours of light to their days, by charging others' phones, lighting their stores, or powering small electronic devices [25].

Being a part of the formal financial system has tangible benefits for individuals. These range from convenient and secure payment

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How Pay on Demand is changing lives in Kenya, Nigeria and Uganda

Needs met today

- Light in every room: Days have more hours and children can do homework
- Phones can be charged
- Radio / TV bring the world home
- Smartphone gives a contemporary feel, can be used effectively in business

- Brightens dark nights
- Less noise and smoke from generators
- Many hours of daily entertainment
- Can connect with family and friends because phone is always charged

- Light, TV or fridge without financial worries
- More family time and social life
- Higher self-esteem
- Smartphone means better communication and being reachable by clients

Future needs

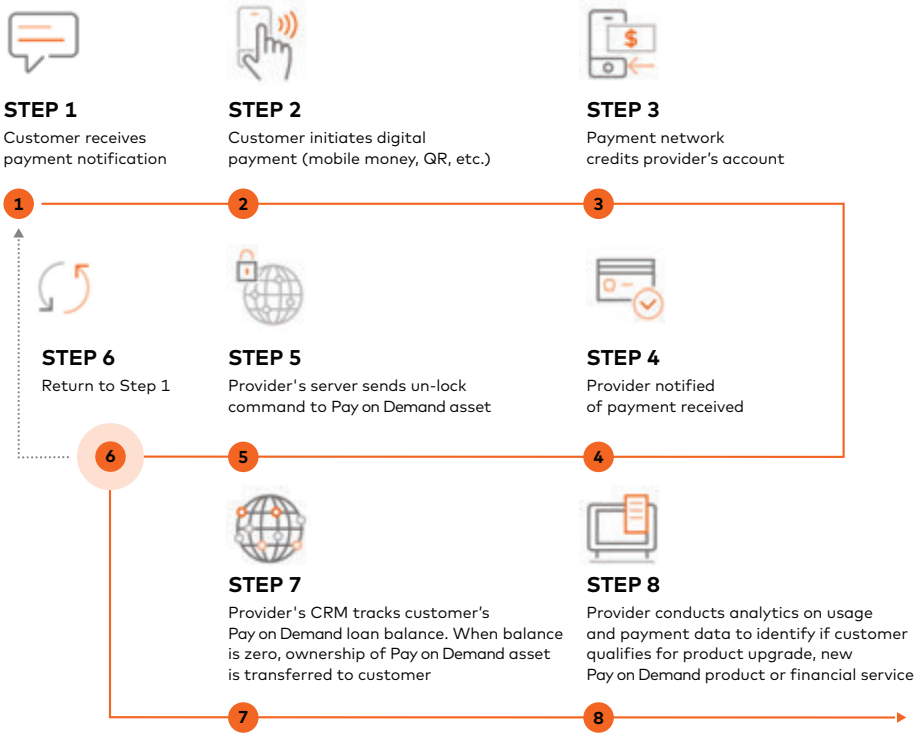
- Cookers (Jiko Okoa)
- Water heaters
- Small loans
- Water tanks
- Motorbikes
- Fertilizer

- More devices like fridge, freezer, cooking appliances and solar panels
- More flexibility in electricity usage (longer wires)
- Ability to charge laptops too

- Ironing tools
- Cooking devices
- Laptops and printers
- Irrigation devices
- Cars and motorbikes

Source: Pay on Demand: Understanding drivers behind the program and identifying the way forward, Mastercard Survey 2020

How Pay on Demand works



750k

off-grid solar systems have been connected by M-KOPA so far

methods to transact with merchants in marketplaces and with their customers, protection against fraud and abuse, and obtaining financing – whether it is to acquire a new home or invest in education or a small business.

Pay on Demand has proved to be ideal in reaching out to underserved customers and helping them embark on a path toward financial inclusion, while gaining access to products that improve livelihoods and create income-generating opportunities.

The Internet of Things (IoT) has transformed Pay on Demand as well. Some Pay on Demand models today are different from traditional asset financing models because the provider has the ability to remotely lock or unlock the asset based on the customer's payment history.

The asset then becomes collateral for the duration of the provider-customer relationship, leaving the customer with little upfront cost and risk, and forming the basis for what is often the customer's first financial service via a microloan.

The most significant application of Pay on Demand in developing markets comes from solar for households outside the reach of the traditional electric grid. However, the market is expanding outside solar home systems and into adjacent industries, such as water, sanitation, telecommunications and agriculture, among others.

According to World Bank data, SSA has a 43% electricity access rate, which is much lower than the global access rate of 87%. In fact, the total number of people without electricity has increased in recent

decades as population growth has outpaced growth in electrification. Furthermore, the access rate is much lower in rural Africa at 25%. [26].

Poor households spend a disproportionately large amount of their income – around 10% – on lighting and phone-charging costs. In a wealthier household, the average is 4% of income and five times more consumption. At the same time, kerosene lamps for light and firewood for cooking are expensive and dangerous for health and safety [27].

Access to electricity can mean much more than light. It allows children to study and watch television safely inside the house. It enables small businesses to connect and explore opportunities via connected devices. It makes everyone feel a part of a larger world and lessens economic, social and financial isolation.

Pay on Demand solar providers are not only working to solve energy needs but also to end financial exclusion of the underserved by supplying households with solar home systems and electricity on flexible payment terms. Solar home systems typically come with a small solar panel, battery storage, LED lighting, a USB port or phone charging cables, and a central power control system. Consumers who opt for Pay on Demand-powered solar systems say the difference is in being able to own one or not. Spreading out the cost of a solar home system over a prolonged period means powering one more household.

One of the largest Pay on Demand solar providers is M-KOPA, founded in 2012. By 2019, it has connected more than 750,000 off-grid solar

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Extending the Pay on Demand model to Uganda's refugee settlements

While the Pay on Demand model is proving its effectiveness in mainstream markets, the humanitarian community too has increasingly recognized the importance of addressing energy needs in emergencies, especially in cases of forced displacement.

523
solar products sold via Pay on Demand plans

80%
consumers are refugees

54%
consumers are female

88%
earn $2 to $14 per month

In Uganda, for instance, where 89% of 1.4 million refugees have unmet energy needs, bridging the energy access gap would transform lives and communities. According to research supported by the Mastercard Center for Inclusive Growth and conducted by Mercy Corps, which works worldwide to alleviate suffering, poverty and oppression, Ugandan refugees are spending their scarce incomes on products like battery-powered flashlights and mobile recharges, even though better quality products are widely available in the West Nile region.

Some of the reasons for this gap include a mismatch between energy products currently on offer from Pay on Demand suppliers and what refugee and host community members want and can afford. Pay on Demand products currently available are too expensive for most refugee customer segments (with the exception of small business owners), and require repayment periods that are too long for most refugee and host consumers, the research survey found.

At the same time, most Pay on Demand providers in West Nile appear to have limited understanding of refugee community purchasing power, or the perceived risks associated with lending to refugees. Refugee settlements pose high costs to service due to dispersed communities, road quality and lack of storage facilities.

The survey showed that most respondents were willing and able to pay the cost of the lowest tier Pay on Demand deposits and smallest off-grid solar lanterns. However, they would require three months' lead time to save the deposit or purchase amount, and shorter payment periods and flexibility to accommodate inconsistent income streams. [31]

systems and aims to touch 20 million lives by 2030. It has raised over $100 million of commercial investment, including large working capital loans from local commercial banks. [28,29]

M-KOPA relies on the value of digital payments and IoT technology for their customers and business. The company has invested in connected Pay on Demand assets and continues to use the data generated by the business to improve business operations, strengthen customer relationships and bring customers into the financial system. [28]

Stemming from the success of its Pay on Demand solar business, M-KOPA now extends its financing to new product offerings such

as televisions, smartphones and chargers, radios and solar-powered refrigerators [30]. In 2018, M-KOPA received over 30 million mobile money payments. In Kenya, M-KOPA transfers customer credit reports to the central credit bureau, and has enabled over 450,000 low-income Kenyans to establish credit-worthiness. [28]

Making other products and services available

There are several other product-specific applications of Pay on Demand, which include clean water, telecommunications, agriculture, cookstoves and gas, and sanitation. All comprise consumer products and services that can be difficult for individuals to buy without financing options.

Product-specific applications of Pay on Demand include clean water, telecommunications, agriculture, cookstoves and gas, and sanitation

In providing access to water, eWaterpay allows consumers to purchase credit via mobile money, which is then stored in the eWater Tag. Mobile money purchases are sent within minutes to water dispensers via Amazon Web Services. The company says that through remote pre-payment, government organizations, diaspora and international donors are able to purchase and send trackable water credit to dispensers at schools and health clinics. [32]

PayJoy, a telecommunications company that serves customers in the US, Mexico, Indonesia, India and Africa, uses an innovative model for credit scoring that leverages digital and social media activity and a proprietary lock-out feature that freezes functionality of the phone when Pay on Demand payments are not made. PayJoy also allows customers to choose the payment terms and payback period that works best for them. [33]

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In agriculture, a Nigerian company enables owners to rent out their tractors to other farmers. The operation is facilitated by an IoT-enabled software platform that allows tractor owners to monitor their assets. Hello Tractor works with financial institutions and mechanics to ensure owners have the financing and spare parts needed to expand and maintain their fleet of tractors. [34]

Cookstoves and gas are the focus of Kenyan company PayGo Energy, which offers Pay on Demand LPG-powered cookstoves with smart meter technology. The company uses sensors on the canisters to collect data and to detect low gas levels or malfunctioning canisters. When the customer is low on gas, they receive an alert that a local agent will arrive with a refill. [35]

Sanitation as a Pay on Demand service is offered by Sanergy, which manufactures and sells low-cost portable sanitation facilities called Fresh Life Toilets. Residents receive these solutions via local franchises for a small subscription fee. Sanergy maintains the toilet facility and helps the facility owner operate efficiently by providing entrepreneurship training and business solutions like a mobile money merchant account. The mobile-connected IoT sensors monitor the fill level of the facilities and alert Sanergy collection agents whenever waste needs to be removed. Sanergy then provides this collection and removal service. The company processes the waste and converts it into fertilizer to sell to farmers. [36]

"We'd hear that other people live like this, but we were not able to see for ourselves. Now we can [on TV]. I can charge my phone at home, instead of going to town to do it. Now we don't lose connectivity."

This is changing the game for consumers

Pay on Demand consumers who have acquired assets such as phones and solar home sets have reported many benefits ranging from the financial to the emotional.

Financial benefits include not having to spend money to buy paraffin for lamps, and being able to better care for livestock. "Hyneas would attack and eat five goats in one night. Now we have light to prevent this from happening. And the daily amount to pay is so little that it doesn't stress us," a Nigerian user said.

In Kenya, a Pay on Demand user said: "It has helped people who live in villages live like those in town," and listed having light, watching television, and owning and charging a phone as some of the many advantages of being associated with the program.

A male user said: "It has helped me but it has helped my family even more. I charge my phone in the house now, which means that no one can steal my battery. My children don't need to go to the neighbor's house to watch TV. If they don't do their homework, I can ask them why, because there is light at home. It has made me look like a man."

Electric power is also associated with dignity in an area where supply is erratic. "We don't have to use kerosene anymore. My solar power is on all the time. The electricity may go off for two or more days. People wonder how this man has light when other people are in the dark," a user in Kenya said.

Another user, who reported being the first in the village to get solar power, said: "People came from other villages to see the lights in my house." One user said that it helped children with homework and the fact that they did not have to walk to charge the phone anymore had added to the convenience.

"We'd hear that other people live like this or that, but we were not able to see for ourselves. Now we can. I can charge my phone at home. Earlier we would have to go to town to get the phone charged. Now we don't lose connectivity," a user said on being able to incorporate television in their daily life as a solar Pay on Demand asset.

Another user reported: "I have light everywhere. I am updated on news because I have TV. I don't have to break a leg because I have a torch. All information and communication is complete." [25]

Connected devices are enabling employment

Connected devices can become enablers of planned urbanization and growth by leveraging the gig economy and providing access to services. One of the characteristics of rapid urbanization that African countries are currently experiencing is high informality.

According to the World Bank, the arrival of faster internet in SSA during the late 2000s and early 2010s increased the probability of an individual being employed by 3.1% to 13.2%, depending on the country, in comparison to areas not connected by submarine cables. The impact of broadband on jobs was greater on unskilled and lower-educated workers than in higher-income countries. The probability that an individual held a skilled job increased between 1.4% and 4.4%. The probability of an individual being employed increased by 6.9% to 13.2% across eight countries.

When supported by effective public policy, digital technologies can generate significant poverty reduction and inclusion outcomes. [11]

The smartphone is viewed as one of the most coveted Pay on Demand products

Overall desirability	Most used for	Desired type	Desired price	3G or 4G?
Uganda				
Aspirational devices Enhances social status and relationships	Emails, Google, Facebook, WhatsApp, payments	Most have a Nokia 2.2 Samsung is seen as high quality iPhone is most aspirational	800K-1M shillings ($200-250)	Those without a smartphone do not know the difference Those with smartphone prefer 4G
Nigeria				
Most have owned one for 6-12 months	Surf the internet Connect with friends & family Listen to music Give to kids to watch videos or play games	Wide screen Good camera Trusted brand like Infinix or Samsung Enough memory for music and videos	20K-40K naira ($55-$110)	Speed of connection is important, so 4G is preferred
Kenya				
Enhances social status and relationships Means of accessing more opportunities	Pictures Facebook Whatsapp	Most own Technophone or Nokia Samsung is seen as high quality	10K-25K shillings ($100-250)	Those without a smartphone do not know the difference All think 4G is faster

Source: Pay on Demand: Understanding drivers behind the program and identifying the way forward, Mastercard Survey 2020

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"I have light everywhere. I am updated on news because I have TV. I don't have to break a leg out in the dark because I have a torch. All information and communication is complete."

Device financing drives access

Device financing can unlock benefits of smartphone access for multitudes of people. Africans understand the value, power and capability of high-technology devices. These cost more but can deliver better sound and camera quality, battery capacity and ability to run apps. While low-cost devices, costing $60 or less, are one way to provide access, Pay on Demand asset financing can help consumers acquire relatively expensive smartphones where that $60 can be turned into a down payment, followed by smaller payments towards device ownership.

Device financing by companies such as M-KOPA means allows consumers to pay small amounts of money regularly. With IoT enabled Pay on Demand, the devices act as collateral so that the lenders feel more comfortable extending credit.

Pay on Demand users in the three countries where Mastercard conducted a survey have different functional and emotional priorities. This model allows the formal financial player to participate in lending to underserved demographics. The digital interaction reduces the processing cost, which is passed on as a benefit to the consumer. This brings down the total cost for the customer significantly, compared to accessing finance from local moneylenders.

NIGERIA: Smartphones and televisions rank immediately after electricity in terms of aspirational value for Pay on Demand users in the Mastercard survey. Most already own a device and use it to surf the internet and connect with friends and family via Face Time, Facebook and WhatsApp. They also listen to music or give the phone to children who watch videos and play games.

Respondents said the most desirable phones must have a wide screen, good picture quality, be from a good brand, and have enough memory so the user can download music or videos to watch later. The most desirable price range is between 20,000 and 40,000 naira ($55 to $110).

Stock photo for illustrative purposes only

"The smartphone has changed my life and my children's lives. They can watch TV on the phone and have learned a lot," said a woman who runs a business trading clothes.

KENYA: Water and electricity top the list that Pay on Demand has enabled for Kenyan users, providing value in daily life. Electricity has top-of-mind recall because it is also linked to having access to light and the ability to charge the phone.

Television sets and smartphones top the list of aspirational products since they bring the external world to the family and offer communication and business opportunities.

Owning a smartphone is seen as keeping up with the times. It is also associated with better social status and relationships, along with business opportunities. An affordable working phone tops the list of desirable products with people complaining about lack of storage, network or picture quality. Most respondents want to pay for quality, considering 10,000 to 25,000 shillings ($100 to $250) as a fair price.

"At a school meeting, teachers were telling parents to buy smartphones for their children for homework. If a child in primary school needs it for homework, everybody needs it," said Mathias, a security officer who uses power and TV on Pay on Demand.

"It is a good idea to have a phone at home for your child, so they don't need to go to an internet café. I don't need to send my kids to the neighbor's house to ask for a phone – this keeps the family together. Even with the TV, it is the same thing; my kids don't have to watch videos in a video café. You can interact with other people far away from you using the phone. You can share ideas – it keeps the children at home away from bad influences."

"It has helped me but it has helped my family even more... I charge my phone in the house now so no one can steal my battery. My children can't tell me that they are going to the neighbor's house to watch TV. They can watch all their soap operas here. If they don't do their homework, I can ask them why, because now there is light at home. It has made me look like a man."

UGANDA: Access to water and electricity is considered the most basic benefit of Pay on Demand, with electricity commanding top-of-mind recall since it facilitates access to light, television and phone.

A smartphone is seen as something that opens up your world, providing access to information, bettering social relationships via communication and social media, and improving one's social status.

Respondents plan to use it for private and professional lives, via email, Google, Facebook, WhatsApp and payments.

The type of phone is considered less important, with iPhone at the top of the aspirational ladder. However, the wish list is a phone that works and is affordable since most own a Nokia 2.2. Samsung is also considered high quality.

The most desirable price range is approximately 800,000 to 1 million shillings ($200 to $250). One concern is an absence of product warranties and the prevalence of fake products.

"I am in touch with my friends; the phone helps me keep up with trends. I am in different WhatsApp groups. I deal in chicken feet and I am part of a group of chicken feet sellers now. This makes me happy," said a smartphone user.

Enhancing the effectiveness of payments: "Easy as 1, 2, 3"

In the Mastercard survey of Pay on Demand users conducted in three countries, respondents voiced three main concerns about their payment solutions:

- High transaction costs
- Payment-due alerts / missed payments
- Ability to access Pay on Demand services on feature phones

In February 2018, Mastercard and M-KOPA announced a partnership to pilot Masterpass QR as a payment channel for M-KOPA's Pay on Demand customers outside Kenya. Customers have the option to make daily payments or top up their solar accounts easily using any mobile device. M-KOPA's solar devices come with a Mastercard QR code pre-printed and consumers can use an app on their smartphones to scan the Quick Response (QR) code to make the

User responses on current vs. upgraded payment methods

	Kenya	Nigeria	Uganda
CURRENT 	• Lipa na M-PESA is the most common method, even for smartphone users	• Bank transfer – using ATM machines, bank app or visiting the branch • USSD code – Fewer people now use this	• Mobile money/Airtel is common via phone or smartphone app • Bank app and branch visits
UPGRADED 	• Not rejected but don't yet see the need to upgrade • Seems innovative but is not familiar	• Well received as it offers more payment options • QR code is highly liked as simpler, faster and easier	• Seen as an improvement – convenient, fast and easy • Seen as innovative • Seen as safe, avoids mistakes

Source: Pay on Demand: Understanding drivers behind the program and identifying the way forward, Mastercard Survey 2020

payment in real time. On feature and basic phones, consumers can pay by sending the merchant ID (a 6-8 digit numeric code) associated with the QR code, using the USSD string on their phone.

The Mastercard QR payment channel is enabled for both banked and mobile money customers. It can pull funds from a variety of accounts, including mobile money wallets, prepaid cards and bank accounts, leveraging Mastercard payments technology. The payment is credited to M-KOPA in real time for the specific smart device.

Mastercard QR provides a streamlined user experience, as it is a simple, two- or three-step payment process. This solution sits in stark contrast to existing digital payment processes serving Pay on Demand markets, which often have complicated interfaces with as many as 11 steps required to complete a payment.

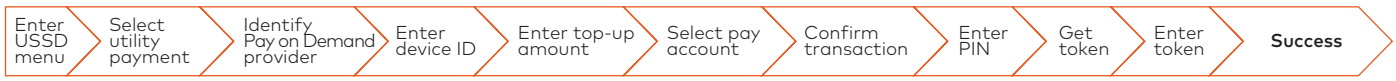
The challenge is not that consumers or small businesses do not want to spend. The issue is related to the availability of funds to prepay for services for long periods at a time or invest in the full cost of a product or service upfront.

Mastercard Labs has developed a Pay on Demand API (application programming interface) that links the device, the consumer account and the provider. This is achieved through device binding and tokenizing both an account number and device number, resolving the technical challenge of collecting payments from a connected device. The API works for solar energy and can also be leveraged for cooking gas, water supply, medical equipment and virtually any other Pay on Demand application.

To address the concerns about missed payments and also extend applicability to all consumer segments, Mastercard has now expanded the Pay on Demand API to work on card credentials in addition to the QR code that works directly on accounts. The payment can now be collected by the Pay on Demand provider from the consumer card in real time (just like an e-commerce transaction). This significantly enhances convenience as consumers can now even go to a zero-step process for payments by allowing funds to be debited directly and securely from their card accounts for a specified amount at a specific frequency, like

Simplifying the payment UX by understanding the consumer

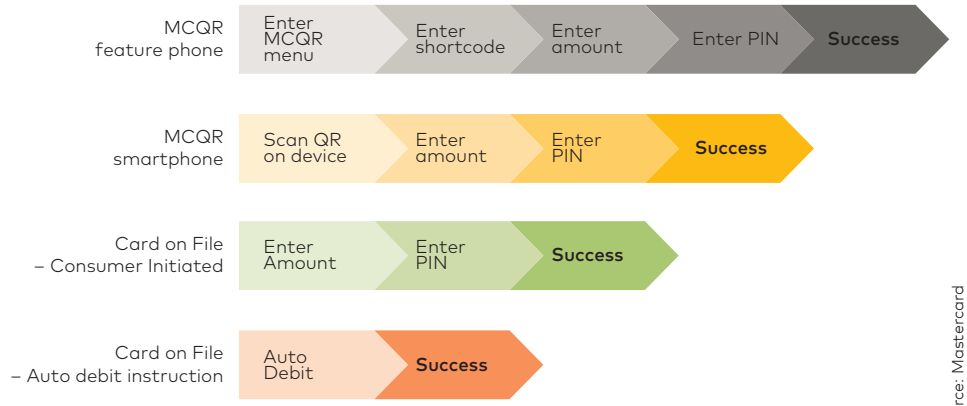
BEFORE: The USSD* method could involve more than 11 steps



NOW: Mastercard QR Pay on Demand solution reduces customer step complexity by about

50%

Mastercard Card on File solution allows scale-up across all consumers with a card and enables the best-in-class experience



Source: Mastercard

* USSD is a communications protocol used by GSM cellular telephones to communicate with the mobile network operator.

a Netflix subscription payment. This resolves the challenges around payment delays or missed payments.

The survey in Kenya, Nigeria and Uganda also gathered feedback from Pay on Demand customers on the enhanced payment methods. Most respondents see the new process as innovative, faster, safer and more convenient. Some respondents voiced concern that it may take up space on their smartphones, while others seemed reluctant to switch – yet – from tried and tested payment methods.

The challenges to the growth of Pay on Demand

Pay on Demand providers need to rely on many factors to scale and offer their products to more underserved populations. There are some challenges to this.

Irregular market conditions and unavailability of Pay on Demand solutions close to the customer result in slow consumer adoption. The overall infrastructure deficit has resulted in poor connectivity, which also affects Pay on Demand adoption.

98%

mobile talk time and data worldwide are pre-paid using small ticket sizes

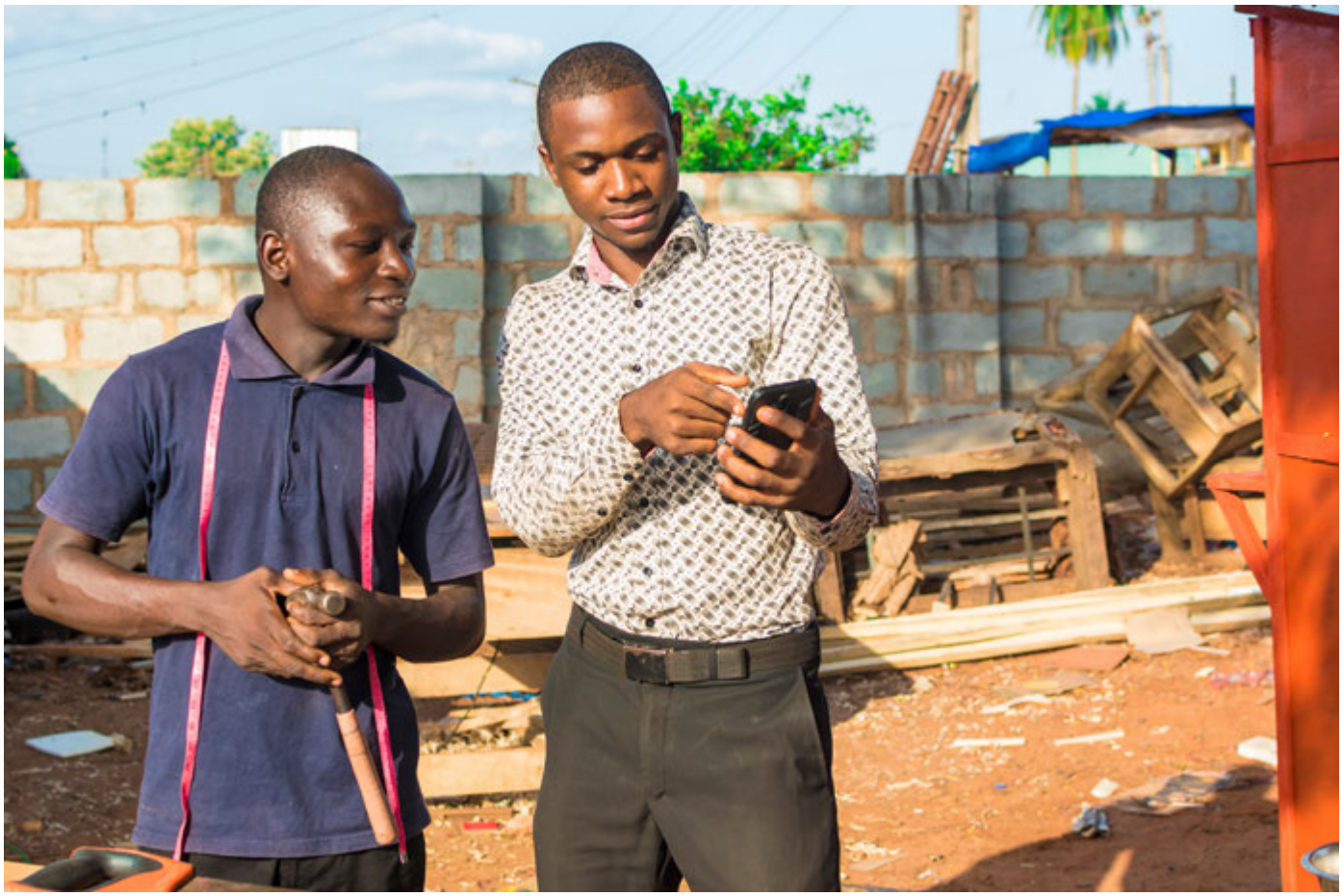
Compliance-related challenges, unavailability of effective payment solutions and unattractive finance rates can all contribute to this. In addition, with technology changing at a fast pace, Pay on Demand providers must continually adopt newer solutions.

Ultimately, digital inclusion drives financial inclusion. The challenge is not that consumers or small businesses do not want to spend. The issue is related to the availability of funds to prepay for services for long periods at a time or invest in the full cost of a product or service upfront. Availability of credit is almost non-existent in the absence of a credit history. Hence the need for low-cost Pay on Demand solutions with small ticket values, just as 98% of mobile talk time and data worldwide are pre-paid in small-ticket purchases. [37]

To enable this, four major stakeholders need to work together:

- Device manufacturers provide the capability to lock and unlock a device in real time based on the status of payments.
- Payment service providers enable consumers to use existing payment credentials to easily pay on demand in small values while also being ready to lock or unlock a device in real time.
- Device distributors, such as multinational organizations with a large market footprint, need to make devices available easily to consumers.
- Financers have to be able to lend competitively and digitally.

The Mastercard Center for Inclusive Growth's innovation team has created solutions to address these concerns. It connects with device manufacturers to integrate real-time lock/unlock instructions on devices. It has also developed an inclusive payment solution that works on both smartphones and feature phones and allows for very small to large payments, auto-debit instructions, and cards that address consumer data connectivity issues and missed payments.



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THEME THREE

Data as an enabler of financial inclusion

Pay on Demand improves the quality of a country's financial data, which is used for making lending decisions

Data for development is used to create evidence-based policies by providing decision-makers with fresh perspectives via proactive analyses of emerging concerns. Financial data can be invaluable in fostering financial inclusion. In the absence of relevant data, financial inclusion becomes impossible to expand into the areas where it is needed most.

This is particularly relevant in SSA, where mobile money has so far been the main driver of financial inclusion. While the share of adults with an account at a financial institution has remained flat, the share of those with a mobile money account almost doubled to 21% between 2014 and 2019. [38]

The region is home to eight economies, including Kenya and Uganda, where 20% or more of adults use only a mobile money account. Up to 95 million unbanked adults in the region receive cash payments

for agricultural products, and roughly 65 million people save using semiformal methods. [38]

When data is shared, the benefits are wide-ranging and immediate. In one use case in South Africa, tax-benefit micro-simulation models, tailor-made to examine the impact of expanding social protection in developing countries, were made possible because of the availability of anonymized tax data. The project relies on researchers having access to granular data on firms and households that, until recently, have been inaccessible and kept under protection of confidentiality.

The availability of financial data that indicates trends can ensure policy-making for prosperity. Upgrading the data analysis capacity of the tax authority and focusing on the largest firms has helped South Africa recover most of the one billion rand (about $70 million) lost through the mispricing of imports, thereby balancing the country's budget and sustaining government spending. [39]

95mn

unbanked adults receive cash payments for agricultural products in Sub-Saharan Africa

According to the International Monetary Fund's Financial Access Survey, SSA, which has a large mobile money footprint, has started leveraging the base of mobile money users to make inroads into traditional banking. An example is the M-Shwari account launched jointly by the Commercial Bank of Africa and telecoms operator Safaricom in Kenya, which offers savings and credit facilities, and can be accessed through M-PESA, the mobile money platform. [40]

A range of mobile-based digital solutions typify benefits being delivered to smallholder farmers, crop buyers and agribusinesses in Kenya's agriculture sector. Last-mile digitalization tools have replaced manual processes with mobile-based solutions that digitize transactions such as procurement payments and receipts. They also help streamline communication between smallholder farmers and agribusinesses. [41]

Direct-to-consumer e-commerce services as well as wholesale marketplaces, along with e-commerce platforms, have created new types of value chains. Direct-to-farmer hubs act as one-stop shops that allow third-party agricultural service providers – such as input suppliers, lenders, agricultural advisory providers and soil testers – to offer their services directly to farmers registered on the hub. [41]

Each digital tool results in generating a large volume of rich data. However, its use is a multi-step process, which begins with:

- Creating a digital profile
- Digitizing payments
- Digitizing processes
- Creating economic identities

When shared with financial institutions, anonymized data can be used to accurately assess the credit-worthiness of farmers and their ability to take on and repay loans. While some initiatives exist to share data with third-party service providers (such as lenders and input suppliers), the exercise remains limited and fragmented. [41]

E-commerce platforms such as Twiga Foods and Tulaa also share data to offer loans to vendors and inputs on credit to farmers. Agribusinesses also have a strong incentive to share data in order to provide additional services to farmers. However, the lack of best practice on how to share data between interested parties hinders any initiatives. [41]

Combining digital payments with IoT technology means that Pay on Demand providers also deliver financial services. And in the absence of a financial history, they rely on analysis of behavioral and consumption data, and the ability to lock and unlock devices remotely, to create internal risk models. M-KOPA shares customer credit reports with the central credit bureau, and has enabled over 450,000 low-income Kenyans to establish credit-worthiness.

Last-mile digitalization tools help streamline communication between smallholder farmers and agribusinesses

Larger financial institutions face significant challenges when lending to mass consumers and MSMEs. The absence of credit bureaus, the high cost of processing and collection, and high risk can be resolved by using alternate methods of payments such as Pay on Demand. Additionally, Pay on Demand also resolves the challenge of Know Your Customer (KYC) initiatives when prospective customers lack formal identification, or when their identification is difficult to authenticate.[42]

Global fintech initiatives use technologies to drive financial inclusion via credit scoring more people, especially those who are new to banking or credit. Singapore-based Credolab, which was recently launched in South Africa, uses AI to collect more than 50,000 data points from a consumer's smartphone and turns them into more than 500,000 behavioral features. The collection process is consensual and permissioned and the collected data is anonymized and securely stored within the country. [43]

These digital scorecards are created using non-traditional data and predictive analytics for credit scoring, thus making it possible for lenders to expand their pool of borrowers while keeping risks under control. This results in lower borrowing costs for consumers. [43]

Data privacy and data security challenges in the emerging nations need solutions that can be overcome by implementing best practice developed in other parts of the world. The European Commission's General Data Protection Regulation (GDPR) is one benchmark.

The Six Data Responsibilities

Security & Privacy
Companies must uphold best-in-class security and privacy practices

Transparency & Control
Companies should clearly and simply explain how they collect, use, and share an individual's data and give individuals the ability to control its use

Accountability
Companies must keep consumer interests at the center of their data practices

Integrity
Companies must be deliberate in how they use data in order to minimize biases, inaccuracies, and unintended consequences

Innovation
Companies should be constantly innovating to ensure individuals benefit from the use of their data through better experiences, products and service

Social Impact
Companies should use data to identify needs and opportunities to make a positive impact on society

Source: Mastercard

Stock photo for illustrative purposes only

The World Bank recommends addressing the need for building a data agenda to support growth and inclusion outcomes of digital technologies

Mastercard launched the Data Responsibility Imperative in October 2019 to advance a dialog around how organizations can work together to close the gap between data privacy and handling, inviting others to join them in the effort. The initiative hinges on establishing a core set of principles guiding ethical collection, management and use of data. The initiative is based on the premise that businesses have a responsibility to individuals, one another and society as a whole in how they manage their data. [44]

The challenges around personal data have also been addressed by the World Bank, which addresses the need for building a data agenda to support growth and inclusion outcomes of digital technologies. [45]

The level of digitalization brought to such a market by Pay on Demand initiatives is expected to support government in their broader digitalization agenda as well as result in higher lending to micro SMEs.

Pay on Demand also gives aspirational youth of the region access not only to basic services but also to smart devices and on-demand services. Mobile network operators are pushing to put a smartphone in every palm and helping economies leapfrog the infrastructure lag. Payment and services applications are being built and made available to every individual.

A clear agreement has emerged among all stakeholders that financial inclusion in Africa will be driven by digital inclusion, by democratizing access to services.

Stock photo for illustrative purposes only

THEME FOUR

Community development through digital inclusion

Pay on Demand is supporting communities by empowering men, women and small business owners

Pay on Demand has emerged as "the most consistent and promising approach" to tackling huge obstacles to development represented by lack of access to electricity. [46].

The off-grid Pay on Demand solar power model, which began in East Africa as a combination of accessible solar technology with the region's mobile money advantage, has become a model to follow in ensuring that development reaches everywhere, with various payment channels being added, depending on user convenience.

For companies such as M-KOPA, which is a Mastercard partner in using Pay on Demand solutions, delivering energy is the first step. The basket of offerings is growing with demand from users who see the model as entry into a world of possibilities that was earlier barred to them. Users are keenly aware of the financial and functional advantages of owning a television, a smartphone, a refrigerator, or

cooking appliances, which not only represent a better lifestyle but also pave the way to getting there. Globally, the sales volume of Pay on Demand products grew by 30% in 2018 with revenues growing at 50%, driven by customers upgrading to solar home systems beyond basic products like solar lamps. [46]

Users reported functional and emotional impacts of having Pay on Demand products in their lives. The results are in line with the M-KOPA Impact Survey in Kenya conducted during August and September 2019, when 757 respondents answered questions on how their health, children's education, sources of energy and quality of life had changed after buying M-KOPA solar.

The respondents reported that grid connectivity has not changed since 2018; with 17% of customers being connected. A majority of customers opted for solar kits because they found electricity supply to be unreliable. The primary source of light before purchase of M-KOPA was kerosene at 55%. The amount of kerosene bought before and after the purchase of M-KOPA solar significantly dropped from 2.0 liters to zero liters.

"I use the phone for internet. I'm on WhatsApp, because this is my office. If you're far away and you want a dress made by me, you send me a picture and I will make you the dress. So the phone is my office."

Impact on small businesses: "The phone is my office"

For small business owners, the assets made possible through Pay on Demand have a direct relationship with improved opportunities and increased revenue. Respondents in the Mastercard survey who run small businesses said that being part of a financial system makes them aware of a route towards saving for better purchases. Knowing exactly how much they will be paying in a week or month helps them manage finances better. The emotional security of having products with warrantees adds to the general sense of financial well-being.

With solar lighting kits, they are able to receive their customers at any time of the day, thus increasing sales. Being able to charge their smartphone at any time of the day also means being reachable by potential and existing customers for more orders. Livestock is directly affected by more light – there are fewer predators and chicken do

Ranking the functional and emotional benefits of Pay on Demand

	Kenya	Nigeria	Uganda
Ranking of functional benefits	1 Access to basic necessities 2 Helps manage finances better 3 Increases purchasing capacity 4 Devices and services come with warranty and support 5 Can start/upgrade my business	1 Access to basic necessities 2 Increases purchasing capacity 3 Can start/upgrade my business 4 Helps manage finances better 5 Devices and services come with warranty and support	1 Access to basic necessities. 2 Increases purchasing capacity 3 Helps manage finances better 4 Can starts/upgrade my business 5 Devices and services come with warranty and support
Ranking of emotional benefits	1 Happier and more comfortable family life 2 Reassurance about the safety of children 3 Opens up your world	1 Higher self-esteem 2 Happier and more comfortable family life 3 Reassurance about the safety of family and business 4 Opens up your world	1 Climbing up the social ladder 2 Happier and more comfortable family life 3 Opens up your world 4 Reassurance about the safety of children

Source: Pay on Demand: Understanding drivers behind the program and identifying the way forward. Ipsos survey for Mastercard. January 2020.

Stock photo for illustrative purposes only

well. Being connected to the internet facilitates business networking and the ability to access information.

"I took the solar panel for the chickens, for them to have light. You can't raise chickens without light – when there's light, they eat."

These aspects are lifting the disadvantaged in multiple communities across Africa out of poverty and digital isolation. At the same time, micro and small businesses have reported a positive impact from being able to stay open longer while also connecting more easily with potential buyers and suppliers.

"I took the solar panel for the chickens, for them to have light. Where I live the electricity has no grid. You can't raise chickens without light – especially when they're young, the chicks will step on each other and they will die. At a young age they really need light; when there's light, they eat," said Joseph, who runs a poultry business and subscribes to solar power and TV.

"I use the phone for internet. I'm on WhatsApp, because this is my office. The phone is my office. If you're far away from me and you want a dress made by me, you send me a picture and I will make you the dress. So the phone is my office. The best thing about it is that there is no stress because you're paying slowly," said Ann, a fashion designer and smartphone subscriber in Kenya.

"The smartphone is really good because it helps with communicating via the internet. I even sold some land to a person I never met – I send pictures of the land to him and his lawyer. I'm happy I had the solar so I could charge the smartphone as well," said Julius, a businessman and farmer who uses TV and smartphone on Pay on Demand.

The latest findings are in line with the 2019 M-KOPA Impact Survey in Kenya, which showed that average income (median) of their customers increased from 10,000 shillings to 12,000 shillings between 2018 and 2019. About 86% of respondents reported having more money after buying M-KOPA. They use the extra money to clear loans, pay school fees and buy food.

Impact on families: "My husband stays home more often"

Families work better with Pay on Demand, since they have more time together and their life at home is healthier and more comfortable. Children return from school and do their homework with light, without being exposed to damaging fumes from other lamps.

The access to the wider world makes them feel like parts of a larger whole, ending the isolation that comes from poverty. Children stay under the watchful eye of their parent, being entertained by TV at home. Pay on Demand has powered access to basic facilities, increased the capacity to purchase and save money, and provided reassurance on safety of family and business.

Users reported a better self-image that comes with being able to afford better things. They also enjoyed the prestige of being the first in the village to have solar home kits. A father reported feeling empowered – "I look like a man" – to tell children to study without feeling bad that he could not provide them electricity. A wife said she was happier that her husband stayed home because there was solar TV. Parents said they did not feel bad handing over their phone to their children because it is possible to charge it, when earlier they would have to hide the battery to preserve charge.

"The paraffin was really bad for my children's eyes, especially when doing homework. I only had one lamp and if you wanted to go to the bedroom you'd leave the other people in the dark. Now we just turn on the light. It made our lives really easy," said Reuben, a construction worker who uses TV on Pay on Demand in Kenya.

"M-KOPA helps me with my husband. Now he stays home more often to watch TV. He can communicate more and watch his game, let me know when he is home. We do not pay daily, for a week or monthly, he cannot afford to pay daily. I am the one who pays it at home," said a hairdresser who uses solar power and TV on Pay on Demand.

"The paraffin was really bad for my children's eyes, especially when doing homework. I only had one lamp and if you wanted to go to the bedroom you'd leave the other people in the dark. Now we just turn on the light."

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This is broadly in line with earlier findings on how digitalization impacts education. M-KOPA's 2019 Impact Survey in Kenya showed that the number of hours that children studied increased from two to three each day after the family's purchase of solar kits. About 75% customers said that they noticed improvements in their children's performance at school after installing the kit.

Impact on women: "It has made me more responsible"

Women reported being significantly empowered by using the Pay on Demand basket of products. As entrepreneurs and as primary owners of household work, they reported a life-changing impact.

"When I complete the payment for the fridge, my solar will help in electricity. When [grid] electricity goes off, I still have light. I have worked so hard to build the house I have. I can pay the instalments, not huge amounts. When I divorced my husband I had to work hard... Now people think I am a rich lady."

In one example, a single woman business owner who bought a solar fridge and television said Pay on Demand helped bring her finances and social standing back on track after her divorce.

"Mine is a double fridge and the payment might be tough. When I complete the payment for the fridge, my solar will help in electricity. When [grid] electricity goes off, I still have light. I also pay school fees for my children. I have worked so hard to build the house I have. I can pay the instalments, not huge amounts. When I divorced my husband I had to work hard... Now people think I am a rich lady," she said.

Another woman said her smartphone helps her run her business more effectively, complementing the hard work she puts in. Financial literacy and awareness is another side effect reported by some women. A businesswoman said: "It has made me more responsible. Sometimes you are lazy, now you have to pay daily. It helps you plan. Sometimes you do not stand strong financially, but you can still pay in instalments. You need the service but you can pay back later, and still access it."

A better organized household was reported by most respondents. A user in Kenya said: "It changed my life. You wake up and have breakfast. Everyone is organized because when they finish they can watch a program. Children stay indoors, you do not have to go out and look for them. When there is a TV, everything is OK. When they are bored they can come home and watch TV, it also helps with being informed."

The most significant items on the wish list of most current Pay on Demand users today are cooking products.

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OUTCOMES

Creating the tools to engage in a digital economy

The research and survey encapsulated in this white paper outlines a clear way forward. And Mastercard remains committed to delivering innovation that not only addresses payments but also supports a more inclusive future adopting the approach outlined in this paper.

It is our belief that to drive financial inclusion we must ensure that consumers and small businesses have the devices and connectivity necessary to participate in the digital economy and improve their life. And this will happen by getting close to them, solving for their credit needs and enabling easy payment when they want it and in the size they can afford.

Financial data is a key enabler of credit-worthiness. In the absence of traditional credit data channels in Africa, the Pay on Demand model is emerging as a significant source of credit history. Combined with the existing data generated by Mobile Network Operators (MNOs) and service providers, this can be a powerful tool for enhancing the credit-worthiness of individuals and businesses, eventually leading to a better financial future and enhanced prosperity.

All stakeholders – governments, MNOs, small businesses, payment service providers, device manufacturers, financers – need to participate collaboratively to enable this digital inclusion that leads to financial inclusion.

Major stakeholders responsible for creating this ecosystem are:

- **Device manufacturers** provide IoT-enabled devices with the capability to be locked and unlocked in real-time, depending on the status of a user's payments.
- **Payment service providers** make it possible for consumers to use existing payment credentials to unlock Pay on Demand services in small increments securely, while also being ready to lock or unlock a device in real-time.
- **Device distributors** such as MNOs with a large market footprint make affordable devices more easily available to consumers.
- **Financers** need to be willing to lend at competitive rates, digitally.
- **Government** support is important to promote inclusion within the framework of regulation that is responsive to the realities of each market.

The availability of affordable smart devices, powered by small-ticket real-time payments secured by the capability of remotely unlocking and locking a device, combine to bring underserved segments of a population into the financial mainstream

The availability of affordable smart devices, powered by small-ticket real-time payments secured by the capability of remotely unlocking and locking a device, combine to bring underserved segments of a population into the financial mainstream.

It is our belief that the Pay on Demand ecosystem is an ideal way to enable digital inclusion in Africa, leading to an increasingly prosperous and financially inclusive society.

Authors

This white paper was written in partnership with Mastercard's Digital Payments & Labs, Mastercard Labs for Financial Inclusion, and White Paper Media Consulting.

The findings and recommendations presented in this paper were informed by secondary research, as well as interviews with Mastercard executives.

The user survey conducted by IPSOS on behalf of Mastercard spanned in-depth face-to-face interviews with more than 40 respondents in Kenya, Nigeria and Uganda.

Acknowledgments

We would like to extend our appreciation to all at M-KOPA and Mercy Corps who were consulted and shared their perspectives in the preparation of this document.

All images are for representational purposes only. Survey respondents' actual images and full names have not been used to protect their privacy.

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