

# THE USE OF IT SOLUTIONS IN INCLUSIVE VALUE CHAINS

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## ABOUT THE AUTHORS

Alice Schmidt, Isabel von Blomberg - Endeava  
Corentin Larue, Claire de Lassus - Fundes

Endeava's mission is to inspire and enable enterprise solutions for development challenges. As an independent institute, we work closely with partners from development agencies, foundations, universities and companies both large and small. Together with our partners, we build, share and apply knowledge about how to develop and implement inclusive business models, which integrate low-income people into the value chain as consumers, producers, employees and entrepreneurs. Endeava's sectors of expertise include agriculture, health, energy, education and tourism.

FUNDES is a Latin-American consultancy that specializes in micro, small and medium-sized enterprise (MSME) development and their successful integration into large companies' value chains. With offices in 13 countries, a network of 500 consultants in the field and an average of 100 projects a year, FUNDES is a preferred partner for large companies willing to generate efficiency, profitability and sustainability along their value chain, in sectors as diverse as agriculture, oil & gas, mining, waste management, banking, logistics, tourism and retail. Its local staff supports MSMEs with a broad portfolio of practical activities such as: training, technical assistance, entrepreneurial and leadership development, market linkages, introduction to technology, among other. FUNDES is continuously investigating and developing innovative solutions to help micro and small entrepreneurs become more competitive, sustainable and profitable.

## INTRODUCTION

**In low-income and emerging markets, companies face fundamental challenges in doing business.** These challenges range from accessing market insights and gaining skills to obtain finance and other key basic services. While larger companies have the means to address and overcome many of these challenges, micro, small and medium-sized enterprises (MSME) as well as smallholder farmers typically face bigger constraints than their larger counterparts and generally find it more difficult to succeed.<sup>1</sup>

**MSMEs thus face a great number of challenges, which impedes their growth and productivity.** This is all the more important given that MSMEs are the backbone of almost every economy in the world, accounting for between 95 and 99 percent of all businesses in most countries.<sup>2</sup> Economic growth and decreasing levels of poverty are typically associated with private sector development, driven largely by MSMEs. Investing in MSME growth and productivity therefore benefits many stakeholder groups, including consumers, governments and larger companies with whom they do business, as well as the economy as a whole.

**Recent developments in information technology (IT) and connectivity have generated a multitude of new opportunities for MSMEs** to grow and become more productive. IT has broken the barriers of time and distance, making it easier for large companies and other stakeholder to work with MSMEs, who in turn are able to overcome informality. Where barriers, such as a lack of access to market information, supply chain visibility and access to finance impede business success of MSMEs, technology can provide solutions that help these companies and their partners overcome high transaction costs, lack of information and lack of networks.

As production networks span ever more widely across multiple countries, the **opportunities to better integrate MSMEs from emerging markets in global value chains are vast.** Suppliers, distributors and customers who have previously been isolated can now be accessed relatively easily with the help of IT solutions. They expose MSMEs to a larger buyer or customer base and enable knowledge transfer from larger firms. Being more efficient and productive – and eventually bigger in size – MSMEs enhance their attractiveness for being included in value chains by larger players.

**Most people already live within areas covered by mobile internet access,** although 4.5 billion people still lack access.<sup>3</sup> Falling device prices encourage the adoption of smartphones, the number of which is predicted to total over half a billion in Sub-Saharan Africa by 2020.<sup>4</sup> In Latin America, with 56 percent of smartphone penetration, the internet is already the medium with greatest reach. In this region, smartphones already benefit from 90 percent of 3G coverage and are thus an extremely powerful communication tool.<sup>5</sup>



In Sub-Saharan Africa, mobile broadband connections are expected to rise from 20 percent of the connection base today to almost 60 percent in 2020.

<sup>1</sup>In this paper, the term 'MSME' includes smallholder farmers.

<sup>2</sup><https://www.oecd.org/cfe/smes/2090740.pdf>

<sup>3</sup>Deloitte (2014) [https://www2.deloitte.com/content/dam/Deloitte/ie/Documents/TechnologyMedia/Communications/2014\\_uk\\_tmt\\_value\\_of\\_connectivity\\_deloitte\\_ireland.pdf](https://www2.deloitte.com/content/dam/Deloitte/ie/Documents/TechnologyMedia/Communications/2014_uk_tmt_value_of_connectivity_deloitte_ireland.pdf)

<sup>4</sup>GSMA (2015). [http://www.gsma.com/mobileeconomy/archive/GSMA\\_ME\\_SubSaharanAfrica\\_2015.pdf](http://www.gsma.com/mobileeconomy/archive/GSMA_ME_SubSaharanAfrica_2015.pdf)

<sup>5</sup><https://www.gsmaintelligence.com/research/?file=e14ff2512ee244415366a89471bcd3e1&download>

Boosting growth and productivity of MSMEs through IT holds great potential to foster business growth and enhance competitiveness. On a more fundamental level, it also promises to secure the income and livelihoods of small-scale entrepreneurs and their families, **thus facilitating socio-economic development.**

This paper is based on a qualitative research **methodology** that **considered all sectors and geographies**, taking into account particularly those where Endeva and FUNDES have deep experience and expertise, as well as in-depth insights into specific companies' business models. While thus being mostly based on secondary research, it also brings elements from primary research done for other purposes by the authors, via interviews, case studies and project engagement. Among others, sectors considered include agribusiness, energy, food and beverage, logistics, and healthcare. Countries around the globe were considered, in particular those in Africa and Latin America, though we also considered examples from Asia, particularly India.

**This paper presents an overview of key IT solutions that can aid MSMEs to become more effective and efficient and help take them to the next level.** The analysis includes specific considerations of how IT solutions can help to better integrate MSMEs into the value chains of large companies for mutual benefit. Besides summarizing key solutions, the paper presents a wealth of company examples that offer IT solutions to strengthen their clients' performance within the value chain.<sup>6</sup>

While Endeva and Fundes are working on advanced technological solutions for developing countries including artificial intelligence or blockchain technology, **this paper focuses on IT solutions that already reach a large number of people in developing and emerging countries.**<sup>7</sup>

We have categorized challenges and solutions into the following key areas, which provide the structure for the following chapters:

- **Solutions that help MSMEs access information**, knowledge and skills to facilitate informed decision-making and efficient and effective operation (section 1)
- **Solutions for transparency and traceability within value chains**, which is an increasingly important issue not only for consumers, but also for other businesses and governments (section 2)
- **Solutions that facilitate MSMEs' access to financial services**, enabling them to invest in improving their operations, as well as to access insurance (section 3)
- **Solutions for basic services, such as health and education**, which affect societies more broadly and provide an important basis on which MSMEs can operate more effectively and efficiently (section 4)

In a concluding section, we summarize our observations and key points of **analysis around the use of IT in inclusive value chains.**

<sup>6</sup> While this paper focuses on the perspective of companies, more examples of market-based ICT for low-income groups can be found in „Leveraging ICT for the BoP“ from Hystra (2011).

<sup>7</sup> This may well be the topic for our next paper. It should also be emphasized that we did not do any quantitative or impact analysis, nor did we systematically analyze the reasons for underutilisation of these solutions.

## Definition of MSMEs

Definitions of micro, small and medium-sized enterprises vary significantly from organization to organization and country to country. In this report, we use the term “micro-enterprise” to refer to self-employed women and men and businesses with fewer than 10 employees; and “small and medium-sized enterprises” for businesses that employ between 10 and 250 staff.<sup>8</sup>

MSMEs make up more than 90 percent of all businesses globally, contributing more than half of all employment and more than a third of gross domestic product. In developing countries, most of them – more than 93 percent – are micro, informal and represent a key source of livelihoods and incomes for some of the poorest individuals and communities. Business Fights Poverty estimates that there are over 900 million micro-enterprises worldwide, including approximately 500 million smallholder farmers.<sup>9</sup>

MSMEs and especially micro-enterprises are a diverse group: many are “necessity” enterprises, who are in business for want of other viable income generation alternatives; others are “opportunity” micro-entrepreneurs actively seeking to grow their businesses. Being a micro-enterprise is inherently risky with very limited protection against rapid market changes or personal and family crises.<sup>10</sup>

### Objectives of the paper and call to action

With this paper, Endeva and FUNDES are pursuing an informative objective: providing large companies, development practitioners and micro entrepreneurs themselves with an overview of the key IT solutions that can support MSMEs to become more effective, efficient and reliable in the context of global value chains.

### We would like to partner with you!

With this paper we aim to provide companies of all sizes, including micro entrepreneurs as well as development organisations with a good overview of the most important IT solutions that help integrating MSMEs in larger companies' value chains by making them more effective, efficient and reliable. We see the present paper as a starting point from which to develop further research to better understand both performance and impact of the solutions provided, and to ultimately work towards scaling and replication. In this endeavour we are looking for partners from the private and public sectors to work with us on the following:

1. Conducting research into different value chains in emerging markets, not only but particularly in Latin America, Southeast Asia and Sub-Saharan Africa, to test the systematic use of some of the described solutions among MSME suppliers and distributors.
2. Conducting a deeper analysis on the impact of IT solutions on the development of sustainable MSME ecosystems in emerging markets.
3. Scaling and replication the most successful solutions.

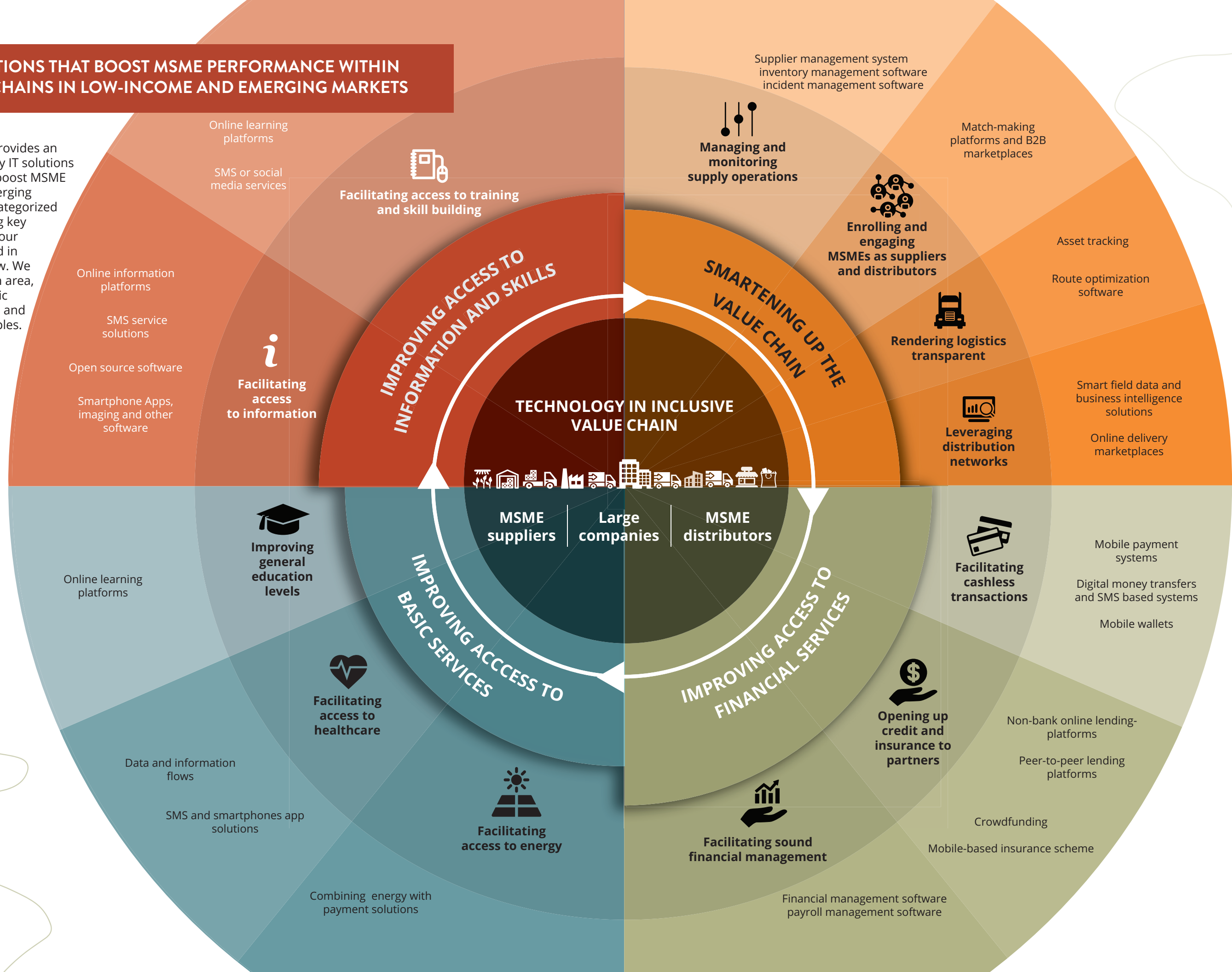
<sup>8</sup> Consistent with the definition used by the IFC.

<sup>9</sup> Growing Together Strengthening Micro-Enterprises In Value Chains (2015) Business Fights Poverty

<sup>10</sup> Ibid.

# IT SOLUTIONS THAT BOOST MSME PERFORMANCE WITHIN VALUE CHAINS IN LOW-INCOME AND EMERGING MARKETS

This chapter provides an overview of key IT solutions that can help boost MSME success in emerging markets. We categorized solutions along key challenges in four areas, depicted in the chart below. We introduce each area, address specific sub-categories and present examples.





## 1. IMPROVING ACCESS TO INFORMATION AND SKILLS

The productivity of MSMEs is strongly correlated with their ability to access information – particularly market information – and to deepen staff expertise on relevant subject, especially through trainings and skill-building activities. This chapter will investigate how technology can be used to improve access to information for MSMEs, as well as the information flow to larger companies. We will first look at the implications of increased exposure to information for MSMEs that buy and sell products, and then consider the implications for service providers in sectors such as healthcare.

### 1.1 FACILITATING ACCESS TO INFORMATION



In emerging markets, basic market information is often lacking. This can significantly inhibit an MSME from developing a successful business model and reaching a reasonable level of productivity. The inability to access market information, such as prices and market trends, often leaves MSMEs unsure about market demand. At the same time, they are often not well informed about their suppliers' needs. A number of IT solutions are used to improve MSMEs', including smallholder farmers' access to information across all sectors and geographies. These include online information platforms, SMS information services, open source software, and smartphone applications.

► **Online information platforms** provide insights on market prices, weather, production techniques and many other key areas. Importantly, such platforms often serve to connect MSMEs with each other, as well as to create linkages with cooperatives and associations, who in turn link to large companies. This facilitates integration of MSMEs into the value chain of larger companies, whether as suppliers or customers (see more on this in chapter 2). While by no means limited to this sector, IT solutions facilitating access to information are particularly pervasive in the agribusiness sector.

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### 1.1 FACILITATING ACCESS TO INFORMATION

**M-farm** is an online trading platform that connects farmers in Kenya with prospective buyers, thus providing farmers with price transparency and access to markets. M-farm also provides information on price trends, which farmers can use to take decisions on planting schedules, and other services. In addition, the platform provides a clear, easy-to-use step-by-step guide on how to reach optimum crop production.<sup>11</sup>

► **SMS service solutions** provide data and information at regular intervals or on request. These may range from market prices and weather forecasts or warnings, to technical advice and reminders that facilitate MSME business processes. While such services are often free to the end user, intermediaries, such as NGOs, often pay for the cost of the service. Some of these services also facilitate peer-to-peer (P2P) exchange of information amongst end users. Rather than relying on smart devices and internet connectivity, these services are typically available on simple feature phones, thus benefiting MSMEs and farmers, even in remote and rural areas.



**Ignitia** provides localized weather forecasts to smallholder farmers via SMS. Ignitia's model is tailored for the tropical climates where it is offered and creates remarkably accurate, hyper-local GPS-specific forecasts. Farmers can use the information to make better farming decisions and increase their yield. Ignitia currently reaches 325,000 farmers in West Africa, increasing yields by 50-80 percent.<sup>12</sup>

**aWhere** provides weather and agronomic data to smallholders through SMS, web and mobile applications. aWhere collects and analyzes billions of data points from around the globe to create agricultural intelligence.<sup>13</sup>

► **Open source software (OSS)** is a publicly accessible software, meaning that people are free to use, modify and share information through this channel. In its capacity to support local software industries in developing countries, it helps enable innovation and lowers entry barriers to more mature markets. As OSS is typically free and allows for individual customization, MSMEs can build on the technology and adapt the software to their needs. Open source software thus enables MSMEs to compete against multinational companies while also presenting a tool around which to develop a business.

**GnuCash** is an open source finance and accounting application which helps MSMEs apply professional accounting principles and track bank accounts, income and expenses. The open source software is an alternative to commercial packages and thus a free option for small businesses that don't have the budget for more expensive enterprise applications.

► **Smartphone applications**, imaging and other software facilitate access to information, knowledge and data, often in a very tailored manner, particularly in the health sector. Beyond information platforms and SMS services, sensitive and even life-saving health insights can be provided and shared via smartphone apps. These applications are particularly useful in more remote areas, where health service coverage is highly limited and providers' knowledge and skills are relatively weak. For example, using images taken with cell phone cameras, the speed and accuracy of diagnosis can be improved.

<sup>11</sup>M-Farm (2018). <https://www.mfarm.co.ke/>

<sup>12</sup>The Practitioner Hub for inclusive Business (2018). <http://www.inclusivebusinesshub.org/dos-donts-scaling-west-africa-ignitias-story/>

<sup>13</sup>aWhere (2018). <http://www.awhere.com/>

**Babylon Health** is a mobile health service active in Rwanda that enables patients to book appointments through an application, receive prescriptions from doctors and stores medical records. In addition, Babylon Health runs physical health booths that can be visited for video consultations with doctors.<sup>14</sup>

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## 1.2 FACILITATING ACCESS TO TRAINING AND SKILL-BUILDING



Technology has profoundly changed access to learning opportunities. While MSMEs are dependent on the national education system for a basic level of capacity among their workforce (see also section 4 on basic services), they can further build business and other professional skills through IT solutions. These services are indispensable for MSMEs, since a lack of professionalism causes low productivity and prevents many MSMEs from being competitive. For their business partners, such as large companies, this means that IT solutions can help render their value chains more efficient and reliable.

► **Online learning platforms**, including webinars and massive open online courses (MOOC) are commonly used by MSMEs in low-income contexts to improve staff capacity and skills.

**MicroMentor** is a global matchmaking platform that connects aspiring entrepreneurs with volunteer business professionals acting as mentors. Entrepreneurs create a profile and are matched with mentors in the online community to start setting goals and solving business problems together.<sup>15</sup>

**Enko** provides online tutorials to Spanish-speaking entrepreneurs in the areas of marketing, sales, finance, administration and personal development. Registered users have access to video material, games, infographics and documents for download to improve their business skills.<sup>16</sup>

**Venture Capital for Africa (VC4A)** runs the V4C Startup Academy, an online academy for entrepreneurs with access to learning topics to set up, grow and finance a start-up.<sup>17</sup>

► As is the case with access to market information, effective solutions often come in the form of **SMS or social media services**, offering bite-sized learning, particularly in the agribusiness and retail sector. Many small-scale farmers can increase their productivity using the advice on best farming practice, such as livestock rearing and crop production, through such services.

<sup>14</sup>Babylon Health (2018), <http://babyl.rw/>

<sup>15</sup>MicroMentor (2018). <https://www.micromentor.org/>

<sup>16</sup>Enko (2018). <https://www.enko.org/>

<sup>17</sup>VCa\$ (2018). [https://vc4a.com/benefits-entrepreneurs/?ref=welcome\\_entrep](https://vc4a.com/benefits-entrepreneurs/?ref=welcome_entrep)

<sup>18</sup>WeFarm (2018). <https://wefarm.org/>

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## 1.2 FACILITATING ACCESS TO TRAINING AND SKILL-BUILDING

**WeFarm** is a P2P service that enables farmers to share best practices via SMS. Farmers can send a free text to the local WeFarm number, which is then posted online. This service enables farmers to crowd-source answers from other farmers around the world, as well as to send messages to selected members of the WeFarm community via SMS. Answers are provided via SMS, enabling farmers to access information through basic mobile phones with no internet access.<sup>18</sup>

**iCow** provides farmers in Kenya with best farming practices via SMS, including crops and soil, cow care and costs of milk production, helping reduce their business risks. The service also includes a farmers' library and a calendar function that sends reminders to farmers when to take action.<sup>19</sup>

**Entre Tenderos** is a Facebook community of MSME retailers in Colombia that provides shopkeepers with a place to learn, communicate and collaborate. For the more than 4,000 members, the Facebook community offers an opportunity to access tips on how to improve their business (e.g., sales, merchandising, finance) competitions, and experience shared by other shopkeepers. For food and beverage companies, the community offers a unique information and communication channel with traditional shopkeepers.<sup>20</sup>

<sup>18</sup>WeFarm (2018). <https://wefarm.org/>

<sup>19</sup>iCow (2017). <http://www.icow.co.ke/>

<sup>20</sup><https://www.facebook.com/entretenderosco/>





## 2. SMARTENING UP THE VALUE CHAIN

The value chain can be seen as series of largely discrete, independent steps by which businesses receive raw materials, add value to them, and then sell finished products to consumers. Information and communication technologies can help bring down walls between these elements of the value chain and make it an integrated and transparent system for all players involved, from suppliers and transporters to distributors and consumers.

For large companies in emerging markets, digitalization and the evolution of traditional value chains toward connected, smart, and highly efficient ecosystem represent key drivers for competitiveness. The level of digitization of the value chain is expected to rise rapidly over the next few years in every part of the world.

This chapter will introduce solutions for managing and monitoring supply operations, facilitating engagement between MSMEs and other parts of the value chain, rendering logistics transparency, and for strengthening distribution networks.

### 2.1 MANAGING AND MONITORING SUPPLY OPERATIONS

In developing countries, the lack of communication, collaboration and mutual understanding between large companies and their MSME partners affects the efficiency, reliability and sustainability of the value chain. Large companies typically consider MSMEs as necessary but elementary components of their supply chain and not as sources of value creation. This prevents them from paying appropriate attention to measuring, incentivizing and making contributions to improving their MSME partners' performance.

Due to this limited collaboration, businesses cannot rely on their MSME suppliers to reduce costs, improve quality, and develop new processes and products faster than their rivals' vendors can. At the same time small suppliers cannot leverage their market access and relationship with large companies to professionalize their business and grow.

2



### 2.1 MANAGING AND MONITORING SUPPLY OPERATIONS

The value chain hence operates sub-optimally and remains vulnerable to inventory fluctuations and disruptions, such as accidents, delays or incomplete inventory.

A number of ICT solutions exist to support large companies in more efficiently managing inventory, disruptions and small suppliers along their value chain. These include supplier management systems as well as inventory and incident management software.

▶ **A supplier management system** - essentially cloud based software - provides the set of evaluation mechanisms, processes, policies and incentives that help maintain a good level of supplier performance, thereby also facilitating an efficient relationship between partners. Supplier management systems often take the form of a cloud-based platform linking MSME suppliers and large companies, helping the latter to evaluate, segment and incentivize MSMEs' performance, communicate and collaborate with them, provide detailed standards, processes and policies, and plan purchases, logistics and payments.

**SAP Rural Sourcing Management** is a cloud based application tracking agricultural products from smallholder farmers, no matter how remote the location. First launched in Uganda in cooperation with German development cooperation agency (GIZ), the application offers a web interface to farmers, buying agents, warehouse managers and agribusiness companies to record purchase of agricultural products and track transactions as well as product feature data (e.g., quality, certification, location), all via phone. The application also fosters farmers' compliance with current and future agriculture regulations and boosts their loyalty by helping them improve forecasting and planning.



In emerging markets, this evolution toward a smart, inclusive value chain will rely on a number of mobile applications and software that will improve supplier-, inventory- and information flow management by strengthening analytics, visibility and communication along the value chain.

▶ **Inventory management software** helps companies manage their inventory and thus maintain optimum inventory levels for each item. Easy to use software allows companies to react fast and efficiently to supply chain fluctuations, ultimately using data to reduce inventory management costs. This type of solution increases customer satisfaction by improving delivery performance and avoiding product stock-outs or emergency deliveries.

**Zoho Inventory** is a stock management, order fulfillment, and inventory control software, especially designed for growing businesses to enable them to keep track of every unit, create sales strategies, buy items at the right time and keep their customers satisfied.

▶ **Incident management software** helps identify, classify, investigate and react rapidly to disruptions along the value chain (e.g., delays, accidents natural disasters, etc.). It does so by logging, tracking, investigating, reporting, and resolving incidents in a systematic, automated manner. The software facilitates better response times, as well as risk anticipation, thus maximizing the efficiency of supply operations.

**OpsGenie** is a cloud-based service that enables operations teams to manage alerts generated by monitoring tools to ensure the right people are notified, and the problems are addressed in a timely manner. The system collects and analyzes vast amounts of data, and generates alerts when it detects incidents using multiple notification methods (e.g., email, SMS, push, phone call, group chat). Reducing alert fatigue and response delay, this solution is a way to more efficient operations monitoring along the value chain.

2







## 2.2 ENROLLING AND ENGAGING MSMEs AS SUPPLIERS AND DISTRIBUTORS

Selecting and enrolling suppliers and distributors is a crucial step in any value chain development. In emerging markets, this process tends to be particularly long and burdensome, due to the lack of available information and the need to involve a large number of local actors, including chambers of commerce and local business associations. For MSMEs, the path to successful market access is often even more difficult. They typically lack information on where to sell, how to sell and to whom to sell, and, in many cases, struggle to trust potential partners, such as large companies. This results in many missed business opportunities and can also cause grievances in the collaboration process.

- ▶ Collaboration and matchmaking platforms build bridges between large companies and MSME suppliers and distributors, creating new opportunities for collaboration and enhancing trust and transparency. **Matchmaking platforms and B2B marketplaces** connect large companies with potential local partners in emerging markets, thus facilitating their search for suppliers and distributors, and fostering transparency and efficiency in their business relationship.

**African Partner Pool** is an online marketplace, connecting Kenyan MSMEs directly with large international and local companies to foster transparent and efficient supplier-customer relationships. The platform covers every step of the procurement process, from advertising tenders and opportunities to validation and awarding of contracts. This results in saved time and money, both for large companies looking for the right supplier and for local MSMEs interested in generating new business opportunities and in expanding promotion of their products and services.

**Moglix** is an Indian e-commerce platform (marketplace) that specializes in B2B procurement of industrial products, such as electronics, lighting, hardware and tools, broadly referred to as engineering goods. Moglix currently caters to more than 100,000 SMEs and over 200 large manufacturing companies in India. The company reportedly has more than 200,000 stock keeping units listed on its platform.

**MandiTrades** is another Indian e-commerce platform helping small farmers in India reach potential buyers directly, circumventing the middleman. The application allows farmers to post details about their crops directly from their smartphone and receive commodity prices provided by the Indian government. MandiTrades facilitates market access to farmers, solving their daily marketing issues, and guarantees transparency to buyers and traders.



## 2.3 RENDERING LOGISTICS TRANSPARENT

Trucking operators are the essential link between all elements of the value chain, moving materials from supply sites to manufacturing facilities, repositioning inventory among different plants and distribution centers, and delivering finished products to customers. For multinational companies, guaranteeing the efficiency, reliability and sustainability of their transport operations is a business imperative. However, in emerging markets infrastructure constraints coupled with the industry's low level of professionalization – characterized by untrained drivers, poor route planning and lack of asset tracking – prevent trucking MSMEs from maximizing effectiveness and efficiency of their services. Additional risks, such as traffic accidents, robberies, drivers' turnover and environmental damage, threaten business continuity in the value chain. Turning challenges into opportunities, several companies have developed IT solutions to overcome these issues. These include solutions for route optimization and asset tracking, for example.

- ▶ **Route optimization software** uses satellite-based navigation systems (commonly known as Global Positioning System or GPS) to geo-localize routes, collect time information, forecast market demand and analyze cost-efficiency per route. As a result, MSMEs optimize itineraries and decrease both empty truckload<sup>21</sup> miles and CO<sub>2</sub> emissions.

**Routific**<sup>22</sup> is a route optimization software and application for trucking operators. It suggests optimized itineraries to drivers via a smartphone app and tracks drivers' progress. Available worldwide, Routific reduces empty runs and thus helps companies save time, fuel and CO<sub>2</sub> emissions.

- ▶ **Asset tracking** refers to the recording of movements of an inventory item along the supply chain. This is done either by scanning barcodes or by using tags, such as GPS, BLE (Bluetooth Low Energy) or RFID (Radio Frequency Identification). In the food and retail sector, for example, this solution has become crucial, in responding both to the growing demand from consumers to know where their food comes from, as well as to public health concerns by tracing foodborne illnesses to their point of origin. Asset tracking solutions can also be video-based, enabling businesses to quickly assess the nature of any disruptions along the supply chain.

**SourceTrace**<sup>23</sup> is an application for agribusinesses working in developing countries, providing complete visibility from field to market and tracking the value chain from the source. Working with standard mobile devices, SourceTrace tracks products even in remote and disconnected environments, documents payments and automates records for traceability, certification and agricultural processing.

<sup>21</sup>Also called deadhead miles, empty truck miles are miles the vehicle travels empty going to load the property or travels empty between loads or travels empty when returning to home base after unloading the property hauled.

<sup>22</sup>[www.routific.com/](http://www.routific.com/)

<sup>23</sup>[www.sourcetrace.com](http://www.sourcetrace.com)





## 2 2.4 LEVERAGING DISTRIBUTION NETWORKS

Various IT solutions exist to strengthen, leverage and increase control over this widely dispersed distribution network.

Small MSME retailers ranging from kiosks to hardware shops, small shops, beauty salons, and pharmacies are a central component of any urban and rural landscape in the developing world. For food and beverage, pharmaceutical and consumer product companies, 'traditional' trade represents an essential component of their distribution chain. It accounts for 90 percent of retail sales in Africa and at least 40 percent in every country of Latin America.<sup>24,25</sup> Nevertheless, such micro retailers remain a challenging service channel. Most of these MSMEs are poorly resourced, informal and run by owners with limited education and business skills. They typically provide a limited range of products and services to their clients. These include field data collection solutions and online marketplaces, in particular.

▶ **Smart field data and business intelligence solutions** provide data collection services to support consumer goods companies in geo-localizing, auditing and analyzing their distribution networks. Based on GPS and photo recognition technologies, these solutions enable larger companies, including multinationals, to develop a granular understanding of consumers and the wider business ecosystem, help them segment their point of sales and devise differentiated trade marketing strategies.

**Optimetriks** is a company based in East Africa that provides points of sale census and retail audits to consumer goods companies. Relying on a community of contributors with smartphones and deep learning algorithms to automatically detect content on the pictures they take, Optimetriks enables consumer goods companies to get tighter control over their distribution networks and better understanding of market dynamics in traditional retail.

**FUNDES Digital**, a similar initiative, provides traditional retail points of sale census to consumer goods companies in Central and South America. Based on the data collected in the field, a platform provides visual information and actionable insights both to large consumer goods companies and small MSME retailers.

▶ **Online delivery marketplaces enable** MSMEs to engage in e-commerce and extend their client base. By enabling their clients to order online and receive delivery by the shopkeepers or an intermediary, e-commerce provides urban MSME retailers with the opportunity to compete with modern convenience stores.

In Peru, **Barrio Market** is a mobile app connecting micro retailers to clients in their neighborhood. Clients can order online and receive delivery by the shopkeeper directly at their home.

**Rappi**, a mobile app, sells and delivers restaurant meals and products from supermarkets in several countries of Latin America. It also allows users to order products from their neighboring MSME retailers directly via their phone.

<sup>24</sup>Optimetriks.com

<sup>25</sup>FUNDES (2016) – "Como aumentar ventas a través del canal tradicional en América Latina"



## 3. IMPROVING ACCESS TO FINANCIAL SERVICES

12%

Of adults in Sub-Saharan Africa have one, half of whom have no other formal bank account.

Two billion people worldwide still lack access to formal financial services; 41 percent of MSMEs in least developed countries and 30 percent in middle-income countries consider access to finance as the major constraint to their growth and development.<sup>26,27</sup> Limited financial inclusion, combined with poor financial education, hinders MSMEs in funding their working capital and in investing in equipment, infrastructure and human capital. It affects MSME productivity and production capacity, prevents them from adapting to demand fluctuations and threatens the reliability of their value chain and thus business continuity along the value chain.

At the same time, the mobile money market is rapidly growing in developing countries in particular. While only 2 percent of adults worldwide have a mobile money account.<sup>28</sup> The mobile and smartphone revolution has set the scene for the emergence of innovative non-banking actors, such as telecommunication providers, technology companies, as well as start-ups who disrupt the market with flexible, easy and affordable financial solutions. From cashless payment, SMS-based money transfers and accounting software to mobile-based insurance, alternative credit scoring and non-bank lending platforms, the booming Fintech sector continuously produces disruptive and affordable tools to improve access to financial services in emerging markets.

3



### 3.1 FACILITATING CASHLESS TRANSACTIONS

Traditional point-of-sales (POS) payment systems are not popular among micro retailers in emerging markets. Most of them fear processing delays, administrative overhead and the high fees banks charge for each payment. In addition, many of them operate in the informal economy and lack trust in the formal banking system.

<sup>26</sup>VISA

<sup>27</sup>In comparison, only 15% of SMEs in high-income countries report access to finance as a major constraint.

<sup>28</sup><http://uk.businessinsider.com/the-worlds-unbanked-population-in-6-charts-2017-8/#these-10-countries-saw-the-biggest-increases-in-the-number-of-people-with-accounts-between-2011-and-2014>

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One area of the financial industry that is rife with innovation is the payment sector. Mobile technologies provide a fast, inexpensive, convenient and secure channel for MSMEs in emerging markets to accept and execute digital money transfers. These include mobile payment systems, money transfer apps or SMS-based systems, as well as mobile wallets.

- ▶ **Mobile payment systems** enable MSMEs to accept cashless payments at a very low cost, in some cases even without a bank account. Mobile payment systems typically consist of mobile apps linked to a plug-in card reader to fix onto a phone. This type of solution is affordable, easily accessible and user-friendly.

**Clip**<sup>29</sup> allows small retailers in Mexico to accept credit and debit card payments anytime and anywhere via a piece of card-reading equipment that fits into the headphone socket of smartphones and tablets.

- ▶ **Digital Money Transfer apps and SMS-based systems** allow sending and receiving money in an easier, cheaper (due to more competitive exchange rates) and faster way than through traditional bank transfers. In some cases, users do not need to have a bank account but can use an account provided via the app itself.

**M-PESA** is a famous SMS-based money transfer system reaching over 30 million customers across seven countries.<sup>30,31</sup> Launched in 2007 by Safaricom, a Vodafone affiliate in Kenya, it allows customers to transfer funds and make payments using a mobile phone. Before being able to use the service, users create an account by registering with their ID at an M-PESA outlet. They can then transfer funds they deposited into their M-PESA account to other users or to merchants by sending text messages. Merchants that use M-PESA services can accept cashless payment from M-PESA users.

Several other companies, such as **Paga**<sup>32</sup> (Nigeria), provide similar SMS-based money transfer services.

- ▶ **Mobile wallets** are digital versions of traditional wallets people carry in their pockets. Mobile wallets take the form of an app or an item that comes built into their smartphone. Mobile wallets typically include features such as digital information about credit and debit cards for making payments, store coupons and loyalty programs.

**Oxymoney**<sup>33</sup> provides a mobile wallet solution in India, facilitating pre-paid mobile card recharge and money transfers. It offers businesses an integrated payment processing platform capable of linking multiple participants into a transaction network by adapting to a variety of payment technologies.

<sup>29</sup><https://clip.mx/>

<sup>30</sup>Albania, Democratic Republic of Congo, Egypt, Ghana, India, Kenya, Mozambique, Tanzania, Lesotho, Romania

<sup>31</sup><https://edition.cnn.com/2017/02/21/africa/mpesa-10th-anniversary/index.html>

<sup>32</sup><https://www.mypaga.com/paga-web/customer>

<sup>33</sup><http://oxymoney.com/>

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## 3.2 FACILITATING SOUND FINANCIAL MANAGEMENT

## 3.2 FACILITATING SOUND FINANCIAL MANAGEMENT

Financial illiteracy is globally recognized as a major barrier to MSMEs growth in developing countries. Small business owners usually lack time, staff, education and skills to properly manage their business finances. They struggle with accounting, record keeping and financial forecasting, thus often managing their cash flow in a disorderly manner, missing out on investment opportunities, paying bills with delay, going into debt and ultimately failing. Several technological solutions have been specifically designed for entrepreneurs with poor financial capacity in emerging markets. These include financial and payroll management software.

- ▶ **Financial Management software**, such as apps, can be used to automate accounting operations and ensure accurate financial reporting in a quick and easy way. This type of solution integrates accounting, financial planning, invoice processing, procurement, reporting and analytics into one financial management system.

**SMEasy**<sup>34</sup> is a South African business management and accounting system targeted at small entrepreneurs with little or no accounting skills. It provides MSMEs with accounting software that is easy to use. It includes features for contact management as well as pricelist, invoice and quote generation.

**Inuit**<sup>35</sup> is a global business and financial management software company which provides accounting and bookkeeping software to entrepreneurs and small businesses worldwide.

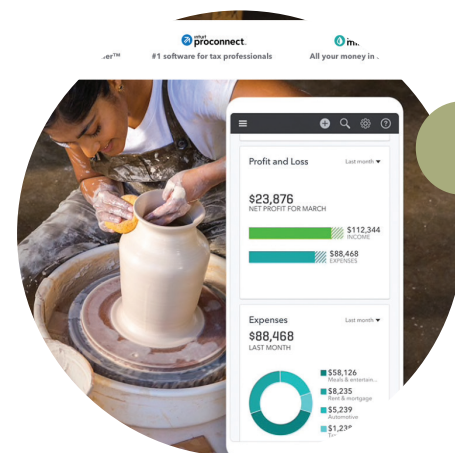
- ▶ **Payroll management** software is designed to organize all tasks related to staff payment. This includes keeping track of time work, wage calculation, tax payments and checking delivery.

**TalentBase**<sup>36</sup> is a human resources (HR) software providing payroll solutions in Nigeria. It enables MSMEs to automate, simplify and organize HR tasks, such as payroll calculations, staff payments, tax automation and leave management. The software allows MSMEs to pay staff who lack bank accounts on easy-to-create mobile wallets.

<sup>34</sup><https://www.smeasy.co.za/enza>

<sup>35</sup><https://www.intuit.com/>

<sup>36</sup><https://talentbase.ng/>





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### 3.3 OPENING UP CREDIT AND INSURANCE TO PARTNERS

In developing countries, credit remains difficult to access for MSMEs, since they are regarded as unreliable and costly businesses to deal with. This is due partly to a lack of collateral and their inability to demonstrate creditworthiness - due to the informality of operations or the absence of proprietary titles - and partly due to their limited capacity to absorb funding from financial institutions. While microfinance has long appeared an ideal solution to MSMEs' financial exclusion, it still bears challenges for entrepreneurs, such as sizable transaction costs (e.g. travel costs to the nearest microfinance institution outlet and opportunity costs for spending time in regular group meetings), social and group pressure, stringent loan terms, and restrictions on how to use the funds provided.

More recently, digital and mobile credit solutions have proliferated as a viable alternative to banks and microfinance institutions for MSMEs.<sup>37</sup> The comparative advantages of mobile credit include rapid loan application and approval processes, alternative assessment of creditworthiness and remote loan processing. Solutions presented here include alternative credit scoring, non-bank lending platforms, peer-to-peer lending, crowdfunding and mobile insurance. **Alternative credit scoring** methods and algorithms use non-conventional data sources to assess credit risk, such as online payments, purchased goods, tax settlements, unpaid tickets, phone and internet bills, social media.

► **Non-bank online lending platforms** collect, check, and analyze documents provided online. This type of solution typically uses financial and non-financial parameters to evaluate potential borrowers as described for alternative credit scoring. Non-bank lenders' attractiveness for MSMEs hinges on their flexibility and low costs.

**Konfio**<sup>38</sup> is a Mexican online lending platform helping MSMEs in Latin America that lack access to credit to obtain convenient and affordable loans. This is done thanks to a propriety alternative credit scoring algorithm that uses a combination of data from social media and online payments to more traditional data to measure creditworthiness. With few requirements, a fully online process and short processing time of less than 48 hours, it grants loans from 50,000 \$MXN up to 800,000 \$MXN (about 40,000\$US).

**AYE Finance**<sup>39</sup> provides customer-centred financial services to Indian MSMEs that need loans for building capital assets or for working capital. It uses alternative credit scoring for those who lack conventional financial documents.

► **Peer-to-peer (P2P) lending platforms** enable individuals to borrow and lend money to each other without the intermediation of a traditional financial institution, thus providing debt financing to MSMEs. Borrowers pay interest on the money they borrow and platform commission rates tend to be relatively low. Generally speaking, this solution thus decreases

<sup>37</sup>In many African countries, mobile money ownership exceeds bank account ownership (CEGA (2017) Digital Credit In Emerging Markets, A Snapshot Of The Current Landscape And Open Research Questions)

<sup>38</sup>[www.konfio.mx](http://www.konfio.mx)

<sup>39</sup><http://www.ayefin.com/>

By exploring different methods of screening, alternative credit scoring has the potential to become a great catalyzer for financial inclusion, as it broadens the scope of financing possibilities for MSMEs lacking conventional documents to ensure creditworthiness.

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### 3.3 OPENING UP CREDIT AND INSURANCE TO PARTNERS



Founded in 2005 in the US, **Kiva**<sup>40</sup> is an online P2P microcredit marketplace allowing microfinance institutions (MFIs) to raise loan capital to fund projects for MSMEs in developing countries. With operations on every continent, Kiva works in the following way: Kiva posts pictures and stories of entrepreneurs needing loans on its platform. Lenders provide money to Kiva, which then sends the funds on to an MFI. The latter provides the loan to the chosen entrepreneur, who ordinarily repays the money. Lenders receive their money back with no interest, thus bearing the risk of borrowers' defaulting on the loans.

**Kubo Financiero**<sup>41</sup> in Mexico and **RangDe**<sup>42</sup> in India are other examples of P2P lending platforms allowing individuals to directly lend money to MSMEs. In the case of Kubo Financiero, the platform permits borrowers to contract loans ranging from US\$200 to \$25,000 with weekly, bi-weekly or monthly payments over a period of 16 to 36 months, while funders may finance various projects for \$1,000 or more and enjoy an average return

► **Crowdfunding** is a way of raising finance by asking large numbers of people for small amounts of money per individual. In emerging markets, many online platforms exist to support fundraisers in communicating their projects and donors in making informed decisions about which projects and beneficiaries to support.

Founded in 2012 in Mumbai, India, **Ketto**<sup>43</sup> supports fundraisers in three main categories: community/social projects, creative arts and personal development. This crowdfunding portal offers fundraisers a unique cash pick-up facility and charges five to eight percent of the funds raised or USD 30 (whichever is higher) along with payment gateway charges.

► **Mobile-based insurance schemes:** In emerging markets, insurers are using mobile phones to address two main challenges facing the micro-insurance sector: increase efficiency and reach scale. Through partnerships with mobile network providers (MNP's), micro insurers are able to provide insurance by leveraging mobile penetration in otherwise hard to reach areas. This makes processes more efficient across the insurance value chain: reducing turnaround times for enrolment, premium collection, claims processing, as well as lowering costs and bridging geographical distances.

**MicroEnsure**<sup>44</sup> the world's largest provider of micro-insurance to low-income people, partnered with several Mobile Network Providers, such as Tigo, to develop, life insurance products, for network subscribers in Ghana<sup>45</sup>, Tanzania, Rwanda, Mozambique, Kenya, the Philippines and India. Typically, MNPs offer insurance products as part of loyalty programs with the ability to include additional family members when customers continue using the same the mobile provider.<sup>46</sup> These partnerships allow the company to add approximately 200,000 new clients per month, making a strong business case for the provision of insurance services to people living on less than \$4 per day.<sup>47</sup>

<sup>40</sup>[www.kiva.org](http://www.kiva.org)

<sup>41</sup>[www.kubofinanciero.com](http://www.kubofinanciero.com)

<sup>42</sup>[www.rangde.org](http://www.rangde.org)

<sup>43</sup><https://www.ketto.org/>

<sup>44</sup><https://microensure.com/>

<sup>45</sup><https://www.hfgproject.org/mobile-money-for-health-case-study-microensure-tanzania/>

<sup>46</sup>[www.bbc.com/news/av/business-40136351/tanzania-s-mobile-based-health-insurance](http://www.bbc.com/news/av/business-40136351/tanzania-s-mobile-based-health-insurance)

<sup>47</sup>Ibid



## 4. IMPROVING ACCESS TO BASIC SERVICES

The success of every company, large or small, fundamentally depends on access to basic services, such as energy, education and healthcare, to operate.<sup>48</sup> While access to basic services is not directly linked to the efficiency of value chains, it is an underlying prerequisite for MSMEs to be able to be included in larger company value chains. This section will explore these types of services typically considered 'basic' and assess selected technology solutions that improve access to those services for individuals as well as companies.

### 4.1 FACILITATING ACCESS TO ENERGY



Access to energy is a key need in itself, as it allows people to light their homes, cook their food and stay warm. For businesses it is essential to remain productive. Importantly, access to energy also affects other basic services, such as the provision of education and healthcare, for example, as schools and hospitals are dependent on electricity to function properly.

In developing countries, lack of access to power is often caused by low grid penetration in rural areas, as well as unreliable supply of power. Where power outages or voltage fluctuations prevail, MSMEs are penalized through halts in production, damage to equipment and negative effects on product quality.<sup>49</sup>

<sup>48</sup>While we also consider access to clean water a basic service, the use of technology in creating better access to end users is limited and thus not part of the present analysis.

<sup>49</sup>ODI (2014): How does electricity insecurity affect businesses in low and middle income countries? <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9425.pdf>

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### 4.1 FACILITATING ACCESS TO ENERGY

The World Bank's enterprise surveys list access to energy as one of the most cited obstacles by firms to grow.<sup>50</sup> While Latin America is almost fully electrified and Asia is quickly catching up, the absolute number of Africans without access to energy remains steady at 500-600 million. And even where there is access to the grid, power outages are so common that in 2013, they cost businesses in Tanzania 15 percent of annual sales.<sup>51</sup> For several years, energy providers have been experimenting with mobile payment solutions that help businesses avoid up-front costs:

► **Combining energy with mobile payment solutions** has been critical to making off-grid solutions affordable to MSMEs, as well as individuals in developing countries. One of the biggest obstacles to the growth of solar power in Africa is the lack of available cash required to pay for hardware. Many solar energy providers therefore become bank substitutes, providing loans to customers with no credit history. High cell phone penetration has enabled businesses to pay off bills daily or weekly using mobile money (see section 3), which is especially valuable to micro enterprises. For utilities, these technology solutions imply that they can remotely monitor energy consumption and also manage customer payments reliably.

**M-Kopa Solar** provides renewable energy solutions in East Africa and also offers a technology platform that enables mobile payments. The platform is able to capture and process large volumes of data, thus enabling M-Kopa to improve its services in real time.

**Mobisol** provides solar home systems in East Africa. Through its software solution *Solar Hub*, the company manages payments, collects, stores and analyzes customer information, and manages sales processes. Remote monitoring via modem facilitates tracking maintenance issues and allows for the systems to be locked remotely in case of overdue payment, thus minimizing default.<sup>52</sup>

The Indian solar energy enterprise **Boond** sets up on- and off-grid energy solutions in Northern India and partners with microfinance institutions to provide pay-as-you-go energy in rural areas.<sup>53</sup>



<sup>50</sup>IFC (2014): MSME Country Indicators 2014. Towards a better understanding of micro, small, and medium enterprises. <https://smefinanceforum.org/sites/default/files/analysis%20note.pdf>

<sup>51</sup>World Bank (2017). State of Electricity Access Report. <http://documents.worldbank.org/curated/en/285651494340762694/pdf/114841-ESM-PUBLIC-P148200-32p-FINALSEAROverviewWEB.pdf>

<sup>52</sup>Mobisol (2017). <http://www.plugintheworld.com/>

<sup>53</sup>Boond (2017). <http://boond.net/>

## 4.2 FACILITATING ACCESS TO HEALTHCARE



Good health is not only considered a human right but a fundamental determinant of productivity and economic growth. At a macro-level, a high disease burden and poor nutrition have adverse effects on a country's productivity, growth, and economic development. At the micro-level, the performance of company managers and their staff is affected by their ability to access quality healthcare services. Lack of access to quality healthcare can negatively impact MSMEs through productivity losses caused by worker illness. Poor health and nutrition also affect education through increased absenteeism and poorer performance in schools, thus indirectly impacting MSMEs for whom finding adequately educated and trained staff is already challenging.

There are a number of IT solutions that aim to improve access to and quality of healthcare in underserved regions. Specifically, they aim to improve the information flow between health workers and patients, enhance adherence to treatment plans and facilitate access to a wider range of healthcare products. Many of these solutions are based on smartphone apps and SMS services.

- Some IT solutions in the health sector focus on improved **data and information flows** between patient and health workers. Some also combine this with additional forms of engagement, such as product sales.

**LivingGoods** supports a network of health entrepreneurs who go door-to-door to provide health products and services in Uganda. Entrepreneurs use smartphone apps to help them better register, diagnose and treat their patients. The mobile technology, developed by MedicMobile, enables the company to make use of more robust, real-time data flows. In turn, this helps improve the service to patients as well as optimizing the business model.<sup>54</sup>

**Healthy Entrepreneurs** is a network of entrepreneurs that run mini-pharmacies. They use a solar-powered tablet to provide health information to patients, promote new products and order new stock.<sup>55</sup>

- Several **SMS** and **smartphone app solutions** help patients adhere to care and treatment plans. This has a positive impact on patients' health and well-being and benefits companies who are thus prevented from productivity losses due to staff illness.

**Ayogo** creates health applications that help improve patient engagement and thus bring about behavioral change in treatment adherence. For example, the apps help patients that suffer from HIV, obesity and diabetes to adhere to and track their medicine intake.<sup>56</sup>

<sup>54</sup>LivingGoods (2017), <https://livinggoods.org/how-living-goods-uses-smart-mobile-tools-for-better-health-outcomes/>

<sup>55</sup>Healthy Entrepreneurs (2017). <https://www.healthyentrepreneurs.nl/en/home/>

<sup>56</sup>Ayogo (2017). <http://ayogo.com/>



## 4.2 FACILITATING ACCESS TO HEALTHCARE

**M-Afya** provides pregnant women with a flexible financing plan for maternity-related health services, such as antenatal care, in informal settlements in Kenya. It allows pregnant women to make pre-payments for maternity fees using mobile money services. **M-Afya** also disseminates maternity related health messages to women enrolled on the plan via SMS.<sup>57</sup>

**99DOTS** is a low-cost approach for monitoring and improving tuberculosis medication adherence in India. 99DOTS patients receive a series of daily reminders via SMS and automated calls. Missed doses trigger SMS notifications to care providers, who follow up with personal, phone-based counselling.<sup>58</sup>

**MeraDoctor** is an Indian medical app that allows patients to chat directly with a trained and licensed doctor. The app gives people across India access to immediate health advice that follows strict quality standards and monitoring systems to ensure doctors effectively advise patients. MeraDoctor also operates as platform, connecting doctors and patients across India.<sup>59</sup>

Among other services, Colombia's largest private health care network **Fundación Cardiovascular** reaches low-income patients in remote areas through telemedicine. Services include tele-consultations, tele-radiology and ECG through which images and data are transmitted to specialists for diagnosis. This reduces referrals to city hospitals and enables the retention of general practitioners in rural areas by offering them ways to acquire additional knowledge.<sup>60</sup>

<sup>57</sup><http://m-afya.com/>

<sup>58</sup>99DOTS (2017). <https://www.99dots.org/Home/About>  
<http://healthmarketinnovations.org/program/meradoctor>

<sup>59</sup><https://www.ifc.org/wps/wcm/connect/075d358044275d11ab3bbb869243d457/FCV.pdf?MOD=AJPERES>

<sup>60</sup>IFC (2014): MSME Country Indicators 2014. Towards a better understanding of micro, small, and medium enterprises. <https://smefinanceforum.org/sites/default/files/analysis%20note.pdf>





#### 4.3 IMPROVING GENERAL EDUCATION LEVELS

Technology has profoundly opened access to education. This opportunity extends to MSMEs which identify an inadequately educated workforce as a key obstacle to their company's growth.<sup>60</sup> Classroom technologies, such as access to connected electronic devices, can narrow the education gap in developing countries and make up for a lack of up-to-date text books.

► **Online learning platforms** can replace the need for physically accessing business schools. For example, many universities offer distance learning courses (such as MOOCs, see section 1), including free and paid-for options. Courses on business management, accounting, finance and business planning are often particularly relevant for MSMEs in emerging markets. The offer ranges from full degrees to specialized courses, and the degree of interaction with lecturers and other student varies to a large extent.

Online learning platforms such as the **Rwandan Kepler** offer students a mix of online content from global universities and on-site seminars. The online content is adapted to developing countries through mobile compatibility, as many users often access content on their phones. By offering U.S.-accredited degrees, Kepler provides affordable access to quality tertiary education.<sup>61</sup>

**Chalkboard** education uses mobile technology to make content available to students. The app is accessible without internet connection. Institutions using this program can track and analyze metrics related to students' learning patterns with the aim of improving their engagement and results over time.<sup>62</sup>

## CONCLUSIONS

Our research has identified a range of **technologies that help make value chains more inclusive**. Most of the technology solutions can be grouped into three distinct categories: 1) online platforms, 2) SMS services (many of which work on feature phones) and 3) mobile applications (usually dependent on smart phones). They can all be applied even in low-resource settings, thus making them very attractive to companies operating in emerging markets, as well as their business partners.

We have clustered specific technology solutions around **key challenge areas**, namely improving access to basic services, accessing information, smartening up value chains, and improving access to finance. With few exceptions, these are the challenges that all players face when doing business in low-resource settings, no matter which sector or geography they operate in.

While most of the presented examples are specific to a given geography, the solutions behind them can **easily be scaled and replicated in other areas**. In other words, these solutions can be adapted from one sector and geography to another, and there is little that prevents businesses from adapting them for their own success.

Yet, despite the potential for both MSMEs and other stakeholders, it appears that the **uptake of technology solutions in developing countries is lagging behind need**. Technology could have much higher impact if the uptake of existing solutions was stronger. If technology is becoming more accessible and affordable, why is it still not widely used? A number of reasons have been put forward, including lack of skilled manpower, low awareness of the benefits of technology, cost, security concerns, privacy concerns and poor infrastructure. At the same time, there is often a resistance to change habits and preferences, especially when the value proposition for adopting technologies is not clear and considered to be excessive risk taking.

'**Selling points**' that help facilitate and increase uptake include arguments such as cost savings, productivity gains, partnership development and improved quality. In addition, information and education of the benefits of a given technology is key, as is developing the trust of potential users.

There are also a number of **enabling factors** for increased uptake in the external environment of MSMEs. These include increasing connectivity, smartphone and internet penetration, economic development, as well as the coming-of-age of a young, tech-savvy generation,



The beauty about success in inclusive value chains is that more is more, i.e. that **MSME growth and the growth of large companies are linked**: the adoption of technology catalyzes MSME success and growth, and in turn makes it easier for larger companies to operate in challenging contexts. By the same token, becoming integrated into large companies' value chains can help MSMEs be successful and grow. Ultimately the wider economy will benefit.

While this paper has focused on relatively simple technology solutions that have proven effective in low-resource settings, more advanced solutions, including artificial intelligence and blockchain technology, will find their way into emerging markets sooner rather than later with enormous potential to boost MSME success and growth on trends and future developments (see box).

Technology has clearly disrupted markets and business models everywhere: it is never a solution in itself, but a tool to turn challenges into opportunities.

### TRENDS AND FUTURE DEVELOPMENTS

**Digital farming**, for example, helps farmers leverage services provided by agricultural companies: Agribusinesses can use algorithms on field data shared by farmers to assess an optimal level of irrigation and fertilizer use.

**Artificial health intelligence** is consistently improving access to remote diagnostic analyses. For example, smart devices process images, and based on the extensive knowledge and data they can draw from for analysis, interpret the images. Where it takes health workers several years of training, in many cases algorithms can successfully support health workers in interpreting symptoms and suggesting appropriate diagnosis and treatment options in just a few minutes.

**Smart warehousing** is another trend that might offer suppliers in emerging markets opportunities for efficiency and safety in the future. Smart warehousing relies on management systems, the Internet of Things and sensors to automate virtually every warehousing activity, from communication with arriving trucks and the preparation of a docking slot, to inventory update in real time.

## Panorama of IT Solutions

Categories	Type Of Solution	Example of IT Companies
<b>01</b>	<b>Improving access to information and skills</b>	
<b>Facilitating access to information</b>	Online information platforms	M-Farm
	SMS service solutions	Ignitia/ aWhere
	Open source software	GnuCash
	Smartphone applications, imaging and other software	Babylon Health
<b>Facilitating access to training and skill building</b>	Online learning platform	Enko / Micro Mentor / Venture Capital for Africa
	SMS or social media services	WeFarm/ Icow/Entre Tenderos
<b>02</b>	<b>Smartening up the value chain</b>	
<b>Managing and monitoring supply operations</b>	Supplier management system	SAP rural management system
	Inventory management software	Zoho Inventory
	Incident management software	Ops Genie
<b>Enrolling and engaging MSMEs as suppliers and distributors</b>	Match-making platforms and B2B Marketplaces	African Pool Partner / Moglix / Manditrades
<b>Rendering logistic transparent</b>	Route optimization software	Routific
	Asset Tracking	Source Trace
<b>Leveraging distribution networks</b>	Smart field data and business intelligence	Optimetriks / FUNDES Digital
	Online Delivery Marketplaces	Barrio Market / Rappi
<b>03</b>	<b>Improving access to finance</b>	
<b>Facilitating cashless transactions</b>	Mobile payment systems	Clip
	Digital money transfers or SMS-based systems	M-Pesa / Paga
	Mobile wallets	Oxymoney
<b>Facilitating sound financial management</b>	Financial management software	SMEasy / Inuit
	Payroll management software	TalentBase
<b>Opening up credit and insurance to partners</b>	Non Bank Lending Platform	Konfio / AYE Finance
	Peer-to-peer Lending Platform	Kiva / Kubo Financiero / RangDe
	Crowdfunding	Ketto
	Mobile-based insurance schemes	MicroEnsure
<b>04</b>	<b>Improving access to basic services</b>	
<b>Facilitating access to energy</b>	Combining energy with payment solutions	M-Kopa Solar / Mobisol / Boond
<b>Facilitating access to health care</b>	Data and information flows	Living Goods/ Healthy Entrepreneurs
	SMS and smartphone apps solutions	Ayogo / M-Afya / 99DOTS/ Meradoctor/ Fundación Cardiovascular
<b>Improving general education levels</b>	Online learning platforms	Kepler/Chalboard Education





**THE USE OF IT  
SOLUTIONS IN  
INCLUSIVE VALUE  
CHAINS**