CHAPTER

6

Which One Does Africa Need, Innovation or *Kaizen*?

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1. Introduction

1.1. Background

According to the United Nations Conference on Trade and Development (UNCTAD), the achievement of the Sustainable Development Goals (SDGs) by 2030 requires innovation in development as well as for development (UNCTAD 2017). Three industrial revolutions have fundamentally altered the structure of economies and cultures over the last 200 years and we are now in the Fourth Industrial Revolution (4IR). The accelerating pace of technology dissemination, the convergence of multiple technologies and the advent of global platforms are challenging traditional models of growth (World Bank 2018). The World Bank defines disruptive technology as 'emerging technologies that result in a step change in the cost of or access to products or services, or that dramatically change how we gather information, make products, or interact' (World Bank 2018, iii).

In Africa, there are various innovative solutions emerging with such disruptive technologies. When it comes to innovation in Africa, one can easily image M-PESA in Kenya. In addition to mobile technology, several kinds of emerging technologies have also spread out across the continent. For example, the African Development Bank (2019) published a report entitled *Potential of the Fourth Industrial Revolution in Africa* that analyzes the potential impact of disruptive technologies such as the Internet of Things (IoT), Big Data, Additive Manufacturing (AM), Artificial Intelligence (AI), Drones, and Blockchain. In this context, it is necessary to consider technology and innovation more than ever before when we think about international cooperation for industrial development in Africa.

The Japan International Cooperation Agency (JICA) has been

continuously assisting the industrial development of African countries and mainly supporting productivity improvement by disseminating *Kaizen*. Regarding the relationship between *Kaizen* and innovation, there are different views depending on the scholars involved. Some scholars (Drucker 1990; Lindberg and Berger 1997) insist that *Kaizen* can contribute to incremental innovation. On the other hand, others, for example Masaaki Imai, who is a famous scholar of *Kaizen*, considers innovation as 'major changes in the wake of technological breakthroughs' and suggests that *Kaizen* is therefore an opposite concept to innovation (JICA 2018, 1-9). It seems to Imai that *Kaizen* is not such a radical innovation. This is because improvement of existing products or processes is not likely to bring about technological breakthroughs as Schumpeter implies in his analogy 'Add successively as many mail coaches as you please, you will never get a railway thereby' (Elliott 1980).

Which view is right? Is *Kaizen* already old-fashioned in the current digital era when innovation with disruptive technologies is needed? To discover the answer to such a question, this chapter attempts to clarify the relationship between *Kaizen* and innovation, particularly in the development context of Sub-Sahara Africa.

1.2. Research question

To clarify this, three research questions are set up as follows:

- What type of innovation is most needed in Africa?
- How does *Kaizen* contribute to the innovation process in Africa?
- How to harmonize the effect of *Kaizen* for innovation in Africa?

First, it is necessary to define innovation because there are many definitions of this term such as incremental innovation, radical innovation, sustaining innovation, disruptive innovation, and so on. In addition, it is crucial to define what type(s) of innovation is most needed for the development of Africa. Though it is very difficult to define this, it is important to do so to avoid vague discussion. Secondly, how *Kaizen* contributes to the defined innovations will be analyzed through reviewing several opinions by different scholars. Finally, this chapter outlines a potential way for *Kaizen* to successfully contribute to African development in terms of innovation as the new relationship between *Kaizen* and African innovation.

1.3. Methodology

First of all, this chapter clarifies what type(s) of innovation is most needed for Africa through a literature review of innovation theory as well as a review of emerging innovations. Since one of the difficulties in discussing innovation is due to a complexity in its types, it is particularly important to narrow down the innovation type as a starting point. Secondly, regarding the second and the third research questions, these establish a hypothesis that *Kaizen* contributes to the implementation process (how to brush up a prototype to a practical product). Although sometimes one may think that innovation is something unpredictable and even a spark of genius, the innovation process can include continuous and incremental effort like Thomas Alva Edison's saying that '[g]enius is 1 per cent inspiration and 99 per cent perspiration.' How innovation process and *Kaizen* are related can be investigated by carefully exploring such a step-by-step process. And M-PESA in Kenya is used as a case study to verify the hypothesis based on the literature review to discover coherence between what they did and *Kaizen* practice and philosophy. Finally, the chapter proposes a potential way to harmonize *Kaizen* and innovation based on the translative adaptation approach (referring to the discussion in Chapter 2) for further development in Africa.

2. What Type of Innovation is Most Needed in Africa?

2.1. Definition of innovation

There are more than 40 definitions of innovation (JICA 2018), and the definition depends on each scholar's understanding and focused field of study. For example, Rogers (2003) focuses on the process of innovation diffusion rather than the creation of innovation. Rogers' definition of innovation is 'an idea, practice, or object that is perceived as new by an individual or other unit of adoption' (Rogers 2003, 12). However, it is too broad to discuss here. To narrow down a definition of innovation, this section reviews some of generally accepted definitions as described below.

2.1.1. Joseph Schumpeter

Joseph Schumpeter was the first scientist to introduce innovation theory (Fagerberg 2003). According to him, innovation is defined as the unprecedented new combination of production factors and it can be categorized into five types (Schumpeter 1911, 1939):

(1) Product innovation: introducing new products or improving product quality;
(2) Process innovation: adopting new production methods and processes;
(3) Market innovation: developing new markets;
(4) Supply chain innovation: exploring new sources of supply of new material or partly finished products;
(5) Organization innovation: implementing new organizational forms.

In addition, innovation can be divided into incremental innovation and radical innovation. Incremental innovation is precedented improvement while radical innovation is characterized by unprecedented change.

2.1.1.1. Incremental innovation. Incremental innovation can be referred to as minor improvements and updates of the existing product, process, service, and business model along the initial trajectory. It does not seem to involve technical breakthroughs on a significant scale, but it has nevertheless contributed to the growth of companies as well as the economy (Chen and Yin 2019). Typical example is fuel efficiency improvement in the gasoline engine.

2.1.1.2. Radical innovation. On the other hand, radical innovation—sometimes called 'breakthrough'—is a type of innovation that results in tremendous growth in the basic performance indicators of a product. It has a critical impact on market conditions, competitive environment, and industry structure, or even promotes complete reorganization of industry patterns (Wooder and Baker 2012). It usually takes eight to ten years or more before radical innovation is materialized for practical use in for example, the automobile, energy, pharmaceutical, and internet industries because it requires significant investment for Research and Development (R&D) by leading scientists or engineers, major technological advances, and even completely new concepts (Chen and Yin 2019). A typical example of radical innovation can be a motorcar against a horse drawn carriage and an electric car against a gasoline car.

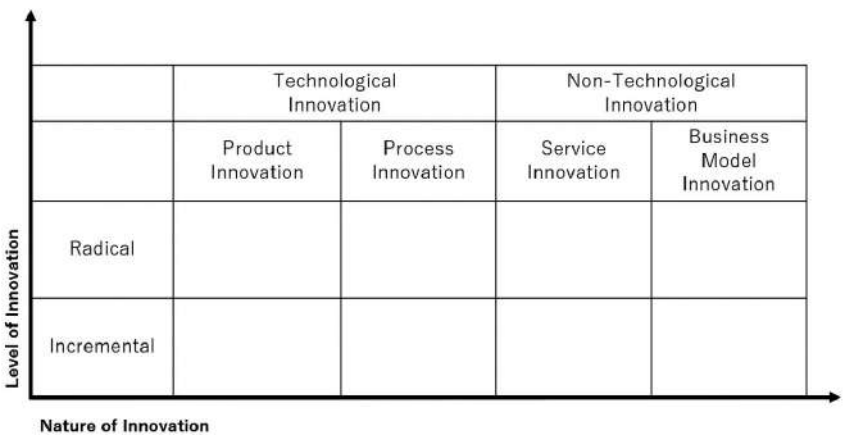
2.1.2. Oslo Manual

One of the generally accepted notions about innovation is proposed by the Organization for Economic Co-operation and Development (OECD). OECD issued the first edition of the *Oslo Manual: Proposed Guidelines for*

Collecting and Interpreting Technological Innovation Data in 1992, updating it in 1997 and 2005. This manual broadly defines technological innovation as follows:

> An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations. (OECD/Eurostat 2005, 46)

Figure 6.1 shows the classification of innovations based on both of the definitions mentioned above.



Source: Adapted from Chen and Yin (2019, 37).

Figure 6.1. Classification of Innovations

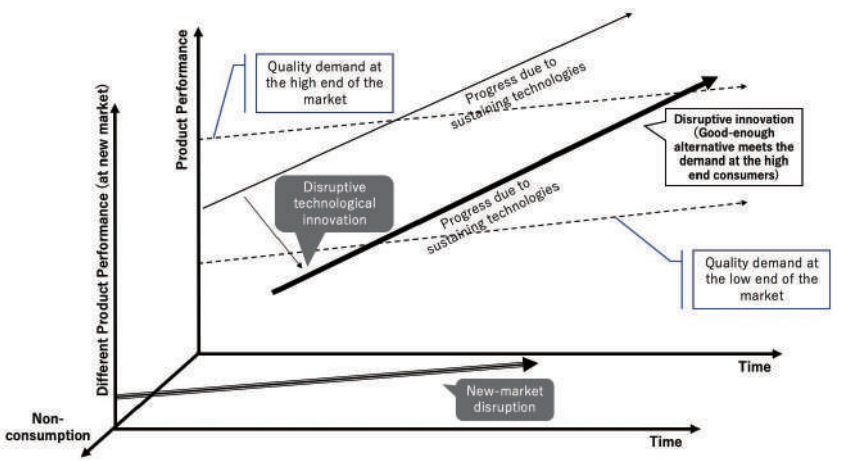
2.1.3. Clayton M. Christensen

In an approach that is different from the abovementioned classification, Clayton M. Christensen provides new dimensions of innovation categorization. He categorizes innovation into sustaining innovation and disruptive innovation in consideration of the sustainability of enterprises (Christensen 2013). Sustaining innovation is to sustain established trajectories of performance and/or quality improvement. Generally, leading companies pursue better and more products/services to satisfy those high-end consumers who have very strict evaluation criteria. So, such companies listen to consumers' voices very carefully and invest in

R&D for sustaining innovation.

On the other hand, disruptive innovation offers 'good-enough' alternatives to what customers in established markets want. In general, disruptive innovation utilizes packaged known and available technologies for products and/or services that are often simpler, cheaper, and lower quality, however it provides new and different values for less-demanding consumers in emerging markets (Christensen et al. 2006; Christensen 2013).

Even if products and/or services are low quality, low technology, and simple, they are gradually improved, and in the long run they can take customers from the high-end market. Although high-quality products makers or services providers also improve their quality to satisfy high-end market customers, their quality can be far beyond customer demand. In the long run, the high-end market customers will select good-enough products or services. This is the mechanism of disruptive innovation as Figure 6.2 shows. Since leading companies are usually not able to invest their resources for such low-tech and low-quality projects and/or services, and if they cannot rid themselves of the existing value network, they will lose their customers. Such innovations break the existing market dominated by big established companies. That is why this situation is called 'disruptive' innovation.



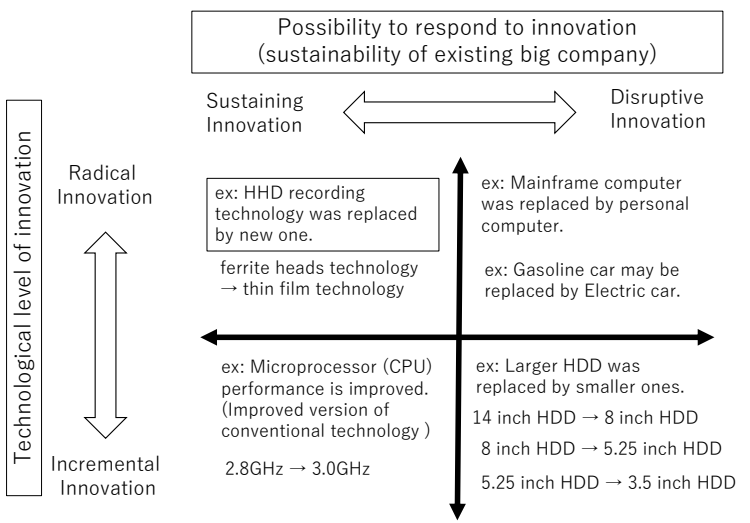
Source: Christensen (2013).

Figure 6.2. Impact of Sustaining and Disruptive Technological Change

In addition, disruptive innovation can be divided into low-end disruption and new-market disruption (Larson 2016). The main difference between the two types lies in the fact that low-end disruption focuses on over-served customers, and new-market disruption focuses on underserved customers, respectively.

- Low-end disruption refers to businesses starting to introduce 'good-enough' products and/or services at the bottom of the markets, and they are generally moving to more profitable markets by improving originally 'good-enough' products and/or services to the extent with which customers in upper markets are satisfied (Larson 2016);
- New-market disruption refers to businesses that compete against non-use in low-margin areas of industry. In other words, it creates a totally new market. Like low-end distributions, the products and/or services offered are generally seen as 'good-enough,' and emerging businesses are profitable at these low prices (Larson 2016).

Disruptive innovation and sustaining innovation are sometimes misunderstood as almost same as radical innovation and incremental innovation. However, they are different notions. The relationships between the definitions by Schumpeter and Christensen can be described as in Figure 6.3 (Sano 2004, 2011).

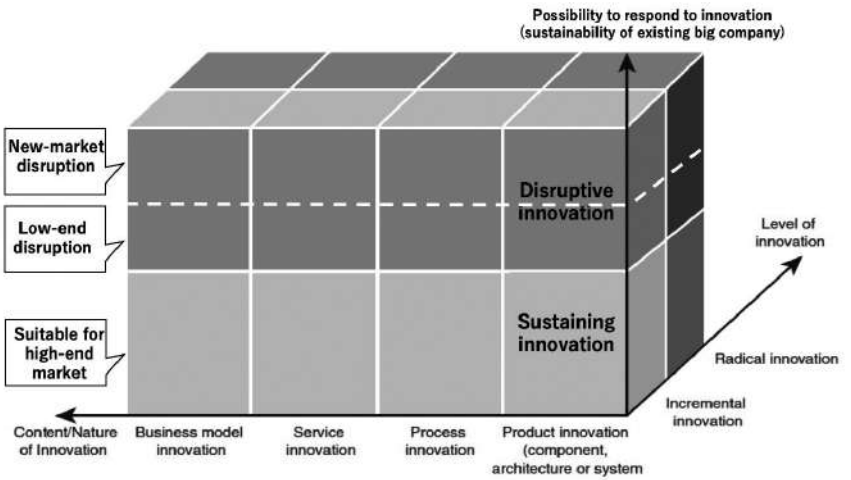


Source: Sano (2004, 2011).

Figure 6.3. Innovation Types by Christensen

2.1.4. Innovation classification

There are several ways to categorize innovation. It is reasonable to use the model by Chen and Yin (2019) in order to understand them clearly. They categorized various types of innovations according to three dimensions: (i) content/nature of innovation; (ii) level of innovation; and (iii) possibility to respond to innovation. Based on these dimensions, the classifications introduced so far can be described as in Figure 6.4.



Source: Adapted from Chen and Yin (2019).

Figure 6.4. Three Dimensions of Innovation Types

2.2. Innovation in Africa

Now, let us think about the first research question: 'What type(s) of innovation is most needed in Africa?' According to Figure 6.4, this question is answered from the three dimensions by answering sub-questions: (i) Which content/nature of innovation is suitable? (ii) incremental or radical innovation? and (iii) sustaining or disruptive innovation?

2.2.1. Which content/nature of innovation is suitable?

To consider the first aspect, it is reasonable to show 'What kinds of innovative business are growing up in Africa?' because they reflect market needs. As Table 6.1 shows, five 'unicorn' start-ups (A unicorn is a

private company with a valuation of over 1 billion dollars) have been born in Africa so far (as of September 2020).

Table 6.1. Unicorn Startups Born in Africa

Company	Country	Business
Promasidor Holdings	South Africa	Promasidor Holdings is a supplier of quality, nutritional, and affordable food products in more than 30 African countries.
Cell C	South Africa	Cell C is a mobile provider that offers a wide range of products and services, including voice, data, and messaging services to more than 18 million customers.
Interswitch	Nigeria	Interswitch is an Africa-focused integrated digital payments and commerce company that facilitates the electronic circulation of money.
Zipline International	Rwanda (United States)	Zipline International builds drones and runs delivery services, dropping crucial medical supplies to clinics and patients in critical need.
Jumia	Nigeria	Jumia is a leading e-commerce platform in Africa. It is built around a marketplace, Jumia Logistics, and JumiaPay. The marketplace helps millions of consumers and sellers to connect and transact.

Source: Created by the author from cbinsights.com and the websites of Jumia and Interswitch.

Of the five unicorn startups, except Promasidor Holdings that handles food products, four are start-ups providing services using new technologies such as mobile, digital payment, and drones. In fact, the potential of new businesses in Africa is highly related to technology. When it comes to investment for African start-ups, Table 6.2 lists the Top10 venture deals in Africa in 2019. This table also indicates that digital services are currently the most promising field in Africa.

All top 10 start-ups are not purely technology companies; but most of them utilize technology to provide their services. Considering the business of these African start-ups, it is not too much to say that most emerging businesses are not selling product but services, especially via technology. As Marc Andreessen (2011) says 'Software is eating the world,' many products and infrastructures are controlled by software. But, currently services are eating software (Bendor-Samuel 2019). Software is becoming to be not sold but used as a service like 'SaaS (Software as a Service).' For example, brick-and-mortar shops are replaced by Amazon.com, printed maps are replaced by Google Map, wallets are replaced by smartphones (mobile payment), taxi is controlled by Uber, etc. Not only

Table 6.2. Top10 Venture Deals in Africa 2019 (Unit USD)

Company	Description	Sector	Funding $	Investors
Interswitch	Payment Processing Company	FINTECH	200 Mn	Visa
Opay	Mobile Money & Payment Services	FINTECH	120 Mn	Meituan-Dianping, GaoRong, Source Code Capital, Softbank Ventures Asia, BAI, Redpoint, IDG Capital, Sequoia China and GSR Ventures.
Andela	Software Developer Training and Outsourcing Company	EDTECH	100 Mn	Generation Investment Management, Spark Capital, GV, CRE Venture Capital and the Chan Zuckerberg Initiative
Branch	Micro Lending & Loans	FINTECH	70 Mn	Foundation Capital, Visa, B Capital, Andreessen Horowitz, Formation 8, Trinity Ventures
Opay	Mobile Money & Payment Services	FINTECH	50 Mn	IDG Capital, GSR ventures
BBOXX	PAYG Renewable Energy Provider	CLEANTECH	50 Mn	Mitsubishi
Carepay	Mobile Health Finance Platform	HEALTHTECH	45 Mn	IFHA-II, Elma Investments, Dutch Ministry of Foreign Affairs (via PharmAccess Group)
SWVL	On demand Bus-Hailing Services	RIDE HAILING	42 Mn	BECO Capital, Endeavor Catalyst, MSA and Vostok Ventures, OTF Jasoor Ventures, Sawari ventures, Arzan VC, Blustone, Autotech, Michael Lahyani
Palmpay	Mobile Money & Payment Services	FINTECH	40 Mn	Transsion (Tecno)
LORI	Aggregator for cargo and truck owners	LOGISTICS	30 Mn	Hillhouse Capital, Crystal Stream Capital, EchoVC Partners

Source: WeeTracker (2019).

in developed countries but also in developing countries, services have begun to dominate much economic activity (Wooder and Baker 2012). In Africa, particularly, services with digital technology, such as M-PESA, e-soko, M-post, and so on, attract much more attention from investors

than traditional businesses. Even in the case of drones, the business is not manufacturing hardware technologies but drone-enabling services. While the primary and secondary industries are still important for national development and the African economy relies on agriculture, services with digital technology are also used to improve productivity and growth in these industries by introducing innovations such as agri-tech or smart agriculture (use of digital technology in agriculture) and industry 4.0 (use of digital technology in manufacturing). Looking at such a trend over the past few years, service innovation can be seen as the most notable and worthwhile field in Africa. Service innovation has much potential to benefit broader sectors and bring about wider impact.

2.2.2. Incremental or radical innovation?

Secondly, it is true that suitability of innovation type depends on resources of companies. 97 per cent of Sub-Saharan African enterprises are microenterprises. In other words, they have less than 10 employees and less than 1 per cent of the world's billion-dollar companies are in Africa. But, small-and medium-enterprises (SMEs) and start-ups are the common players and vital sources of innovation (African Development Bank 2019). Considering this fact, innovation which requires long-term R&D and investment is not suitable for most African countries. In other words, it is not reasonable for most African companies to aim at radical innovation. While radical innovation needs R&D, it takes a long time, like eight to ten years, to materialize (Chen and Yin 2019). In Africa, the report *Global Innovation Index 2020* points out that the resource for R&D relies on foreign donors and low levels of science and technology activities (Cornell University et al. 2020). Of course, it is necessary for African governments to invest in R&D as a long-term strategy; but it is not reasonable for most African companies to set such high goals as the main target. Therefore, it seems that incremental innovation is more suitable than radical innovation in Africa at least as a short-term strategy.

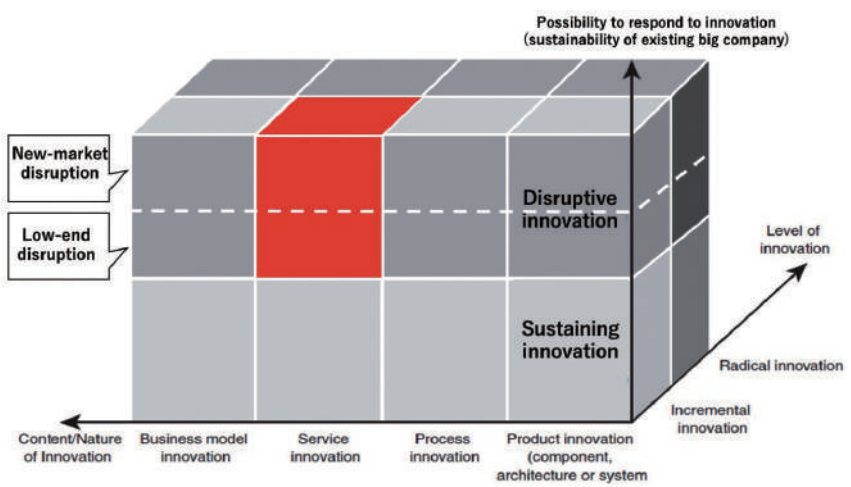
2.2.3. Sustaining or disruptive innovation?

Thirdly, sustaining innovation may not be suitable for most African companies because large companies are better at sustaining innovation since they have more resources and a greater ability than SMEs to produce higher quality products or services in established and mature markets (Christensen 2013). On the contrary, disruptive innovation is materialized

by utilizing simple and conventional technology if it can meet customers' real needs—'good-enough' for low cost. This indicates that there are many more chances for African SMEs and start-ups that know the local reality and context. Even in the developed countries, generally, disruptive innovation does not utilize the latest cutting-edge technology as a minicomputer uses lower technology than a mainframe and a personal computer uses lower technology than a minicomputer (Christensen 2013).

In addition, the target of disruptive innovation is not high-end markets (people wanting better quality and more functions) but low-end markets or completely new markets. The majority of African markets are low-end compared to the ones in developed countries, and there is much potential for new markets since there is still a lack of the necessary economic and social infrastructure.

In summary, service, incremental, and disruptive innovation can be the most suitable types of innovation (Figure 6.5) although the term 'disruptive' may not fit the context of African markets because they are more likely to be 'blue ocean' where there are no existing large companies to be disrupted.



Source: Adapted from Chen and Yin (2019).

Figure 6.5. Suitable Type of Innovation in Africa

In Africa, of course, there are many companies doing innovative business in the primary and secondary industries, and there are some large

enterprises which can invest enough resources to bring about the other types of innovation. However, this chapter focuses on the promising potential in innovation that the majority of African companies can pursue.

3. *Kaizen* and Innovation in Africa

3.1. Definition of Kaizen

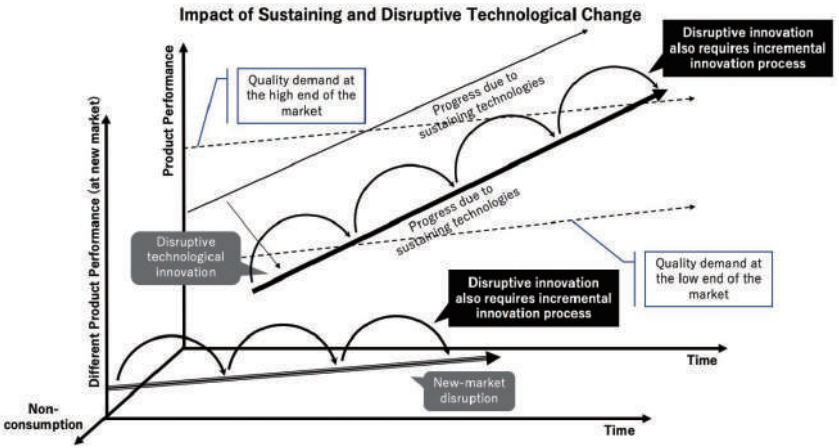
The typical image of *Kaizen* might be tools and methods for productivity improvement, especially in production lines at factories in the manufacturing sector represented by the automobile industry. However, *Kaizen* is a broader concept than just tools and methods. It is used not only in the manufacturing sector but also in the broader sectors such as health and public services (e.g. water supply, electricity). The JICA *Kaizen Handbook* (2018) defines the concept as follows:

> The core value of "Kaizen" is placed in creating the attitude shared among all members of an organization who consistently pursue advanced levels of quality and productivity, and not just applying its management method. Hence, Kaizen is a comprehensive knowledge that consists of broad technologies such as 5S, 7QC tools, TQM, TPS, Lean Production System, etc. to pursue activities under this core value. (JICA 2018, 1-1)

3.2. Kaizen and innovation process

Before discussing the second question 'How does *Kaizen* contribute to the innovation process in Africa?' it is necessary to understand the relationship between *Kaizen* and innovation.

It seems that the practical methods (e.g. quality deployment), systems (e.g. TQM, TPS, TPM), and tools (e.g. 7QC tools, IEs) of *Kaizen* are highly related to work process improvements in a factory in the manufacturing sector although *Kaizen* is applied in other sectors. Even if the staff of IT start-ups learn about *Kaizen*, it seems that they may not be able to apply them to their own digital business. In fact, Masaaki Imai insists that *Kaizen* is an opposite concept to radical innovation (JICA 2018). On the other hand, some scholars (Drucker 1990; Lindberg and Berger 1997) insist that *Kaizen* can contribute to incremental innovation. Why is there such understanding gap about the relation between *Kaizen* and innovation? It



Source: Adapted from Christensen (2013) and Sano (2004, 2011).

Figure 6.6. Relationship between Disruptive and Incremental Innovation

is because of the various definitions of innovation as mentioned above.

As the '2.2. Innovation in Africa' section showed, the most important and desirable innovation in Africa is similar to disruptive innovation with digital technologies in the service innovation field, as the author believes. The disruptive innovations embrace incremental innovation in the quest to improve the quality of processes, products, and services so that they will be accepted by their consumers. As Figure 6.6 shows, when disruptive innovation occurs, the quality level is below the requirement expected by consumers (Christansen 2013). Then, an incremental innovation process is required to improve the quality to meet consumer demand and other requirements, for instance, improvement of usability (user interface, operability, localization, customization, and so on), optimization of production and delivery, and increasing the sophistication of a business model that should be sustainable.

Considering the characteristics of these improvements, it is obvious that *Kaizen* is very useful in promoting incremental innovation. A rough innovative idea can be transformed to disruptive innovation through the accumulation of such incremental innovations. This improvement process is effectively assisted by *Kaizen*. Just coming up a good idea does not necessarily mean that it will succeed after implementation as innovation (Christensen et al. 2006). For instance, standardization for

work process is necessary to scale up and sustain a good idea as business so that the business can be expanded from one location to another location. Otherwise, it is impossible to attract investors for scaling up. However, it is too much to say that *Kaizen* can bring about disruptive innovation. Even though business development (from 1 to 100 phase) resembles the *Kaizen* process, the first step of business ideation with creative ideas (from 0 to 1 phase) is not like the *Kaizen* process.

3.3. Case study—M-PESA in Kenya

Is the abovementioned relationship between *Kaizen* and innovation true? Here, it is examined by reviewing the successful innovation process of M-PESA in Kenya, which is a famous innovation example considered as a trigger of the current innovation for development trend. M-PESA can be categorized as disruptive innovation, especially new-market disruption since it creates a new market of financial services for people who have not been considered as the target customers for such services.

3.3.1. Background

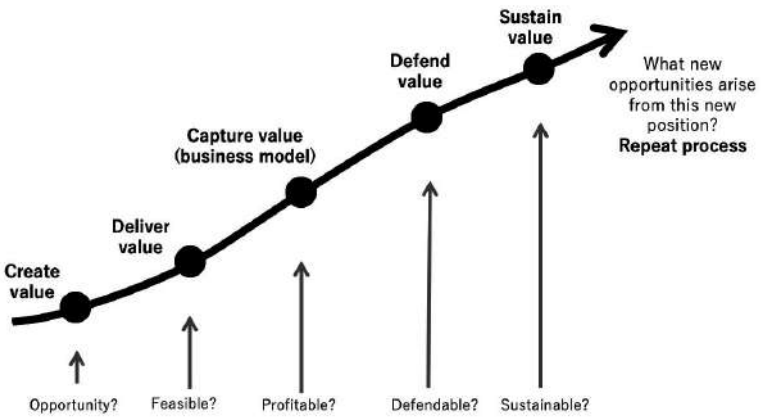
M-PESA was started in 2007. Vodafone and Safaricom implemented this mobile money pilot project in collaboration with a local microfinance institution (MFI) by using funds from the United Kingdom (UK)'s Department for International Development (DFID). The original purpose of this new service was to assist MFIs to collect money from their borrowers who mainly live in remote areas by utilizing the short message service (SMS). The main functions provided are as follows (Wooder and Baker 2012):

- Paying bills, e.g., utility bills;
- Receiving payment, e.g., salaries; and
- Micro-finance services, receiving and repaying loans.

After the pilot project, they shifted the target from MFIs to workers from rural areas to those in the cities because there is much more critical demand for these people to transfer money to their families in a safe way. The service has been rapidly disseminated in the country since then, and about half of the population amounting to 22.6 million people currently use the service as of 2019 (Safaricom 2019).

3.3.2. Incremental innovation of M-PESA

According to Schrempf et al. (2013), through a series of small incremental innovations, M-PESA has met with great success, responding quickly and effectively to the needs of the overwhelmingly poor. In addition, Joshua Nguku (2015), a principal engineer at Safaricom, mentioned that 'The Japanese concept of continuous improvement of a product or *Kaizen* is one other strategy that Safaricom has employed in gaining competitiveness for the product' (Nguku 2015, 62). To understand this in more detail, it is worth examining the research by Wooder and Baker (2012). Stella Wooder, who worked for M-PESA as a director of their external consultant Sagentia (a Cambridge based consulting firm), analyzed M-PESA by using their own service innovation framework in which key innovation stages are mapped to identify factors at each phase for value creation, as shown in Figure 6.7 (Wooder and Baker 2012).



Source: Wooder and Baker (2012).

Figure 6.7. An Outline Service Innovation Framework

Through observing the process of M-PESA service creation according to this framework, several elements of *Kaizen* and incremental innovation are uncovered in each step as follows:

(1) Create value

First, ensuring a clear market-validated proposition is a key step for innovation. Vodafone's product manager spent a lot of time in the field in Kenya, discovering the important valuable point: the need to keep it

simple (Hughes and Lonie 2007). In fact, simplicity is considered as the critical success factor of M-PESA by other scholars (Patrício and Fisk 2013). M-PESA is an excellent example of how an existing technology application can create an innovative service. The new short message service (SMS) is now seen as an 'old' technology in western markets; however 'recycling' this old technology in Kenya allowed a new service to develop (Wooder and Baker 2012).

Elements of *Kaizen*

The *Kaizen* method also puts priority on careful observation in the workplace (called *'Gemba'* in *Kaizen*). To keep it simple and to 'recycle' old technology are also similar to *Kaizen*'s philosophy of removing waste (called *'Muda'* in *Kaizen*) and applying available technology instead of purchasing or inventing new technology.

(2) Deliver value

At the second phase, there are two success factors in M-PESA. One is to use Safaricom's existing airtime reseller network since there were many resellers who could work as M-PESA agents. Successfully establishing customer trust in M-PESA agents is very important because once an agent does not operate the service effectively or keep enough cash to provide for customers, they will not use this service anymore. To avoid such a failure, intensive and repeated training was organized for newly appointed M-PESA agents. Vodafone's product manager spent long hours each day, visiting agents' stores to help them operate and work the M-PESA service (Wooder and Baker 2012).

The other factor is to start the pilot with a small budget for quick implementation. M-PESA was putting a relatively small amount of 'seed' funds into the 'crack' team, which quickly ensured its prominence. Although it usually takes a long time for big established companies to make huge investment decisions for big projects, Vodafone used a small amount of money to get something done quickly (Wooder and Baker 2012).

Elements of *Kaizen*

In the case of *Kaizen*, managers also put more priority on working place '*Gemba*' for process improvement and are encouraged to frequently visit '*Gemba*' for observation. Regarding the quick start with small budget, such a strategy is also relevant to *Kaizen*'s problem-solving method.

Kaizen activity encourages quicker action with available but perhaps limited amounts of input/resource to acquire results even for smaller improvements/successes.

(3) Capture value

A key factor in introducing a money transfer service is the scope of emerging markets, especially in remote and impoverished areas. How should service providers equip their agents with appropriate point of sale (POS) devices to serve their customers? Traditional POS devices are expensive to acquire and maintain and difficult for many agents to purchase. The solution that M-PESA took was to provide a mobile phone with a customized menu relevant to their needs. A basic mobile phone is a low-cost solution that allows the existing resellers to work as M-PESA agents (Wooder and Baker 2012).

Elements of *Kaizen*

Here again, there is similarity to *Kaizen* in making a solution with available technology and relatively small amounts of input/resource instead of procuring new machines and devices.

(4) Defend value

M-PESA was originally designed for MFIs to collect money from their customers (e.g. farmers in rural areas). However, partner MFIs did not decide to use it because mobile money transfers may reduce physical contacts with customers. MFIs usually need to have meetings with them for advocacy activities. On the other hand, the M-PESA organization observed how and who used this service and discovered the greater needs of workers in a city than those from remote areas. Then, M-PESA shifted their target to those who usually send money through informal and unsafe systems (e.g. asking long distance bus drivers to deliver money) to their families living in rural areas. M-PESA's famous slogan 'Send Money Home' was created through this process.

Elements of *Kaizen*

The abovementioned effort by M-PESA indicates that realizing the true value of innovation requires testing, refinement, and iteration. Significant work for observation of local reality and collection of feedback on the ground and subsequent adaptation needs to be undertaken (Wooder and Baker 2012). Such continuous improvement is also similar to *Kaizen* activity as the Plan-Do-Check-Act (PDCA) cycle. One of the typical

examples is the concept of Total Quality Management (TQM) which adopts the idea of continuous improvement through PDCA cycles.

(5) Sustain value

Compared to the beginning of the M-PESA service, there have been several improvements in its service quality. For example, to complete a real-time transaction, a new transaction system was developed. The new system realizes a number of processes (e.g., to establish a connection with the airtime interface, checking the authenticity of the transaction) to clarify the right of users to make requests, the validity of a users' account, the amount of credit, the limitation of transactions on a daily basis, and so on. Incremental innovations have been made to minimize these processes as much as possible for customer satisfaction. Another example is a dynamic mobile menu that displays information on a screen based on user accounts. In the older version of M-PESA, the menu was controlled by the SIM application. Therefore, different types of SIMs were distributed to different types of customers (customer or agent sellers). However, this was later changed to allow a user to use the same SIM. When the user first accesses the M-PESA service, the application will be configured, and the user will receive the appropriate handset menu for them. Wooder and Baker (2012) considered these improvements for better usability as incremental innovations.

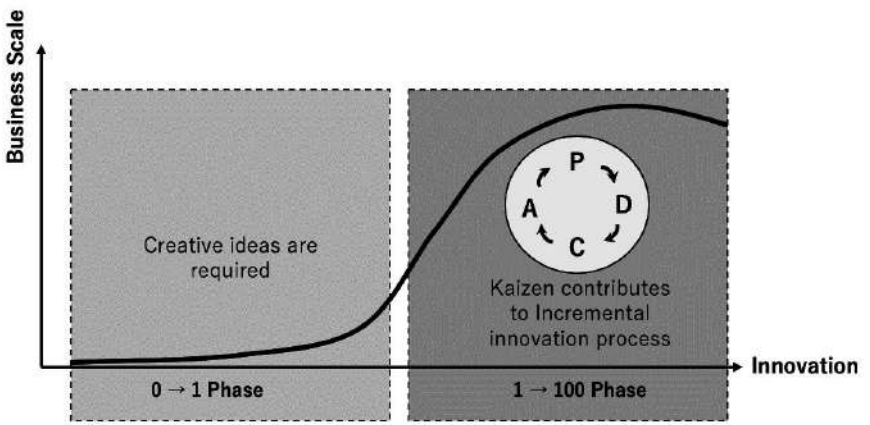
Elements of *Kaizen*

These processes are similar to what Japanese companies are good at based on *Kaizen*. That is, to improve the quality of products and/or services through the accumulation of small improvements in consideration of very minor detail to increase user satisfaction.

M-PESA may be considered an amazing innovation directed by a brilliant idea and technological breakthrough. However, it is 'a classic example of how the application of existing technology can create an innovative service' (Wooder and Baker 2012, 16). As described, the success of M-PESA seems to be built up from many small improvements. In the service innovation process of M-PESA, there are close similarities to *Kaizen* such as the importance of '*Gemba*,' removing '*Muda*,' small but quick actions with limited resources, and PDCA to brush up the usability of the service. In addition, similarity of the concept to *Kaizen* such as 'customer first' and 'value creation' is also observed over all the phases. There can be no innovation without creative ideas. But creativity is different from

innovation, in that the former is a proposal based on creative ideas, while the latter is a more practical and long process to materialize and commercialize the ideas (Chen and Yin 2019). Innovation is the proposal and commercialization of creative ideas, and *Kaizen* is able to contribute greatly to the materialization and commercialization of the creative ideas.

In addition, Wooder and Baker (2012) point out that during the life cycle of a service, the project organization and processes will need to change, from a fast-moving, lean entrepreneurial structure (and culture) to a more mature structure, to implement a fast-to-market service. This means that different competencies are required during the former and latter phases of the innovation process and that the combination of several (service and organizational) innovations created through *Kaizen*-type practices can help an organization to transform so that it can take suitable actions for sustaining value. Figure 6.8 shows this relationship between *Kaizen* and innovation.



Source: Adapted from Maru and Obara (2019).

Figure 6.8. Integral Relationship between *Kaizen* and Disruptive Innovation

Even if technologies are born, many of them are not connected to business. In general, it is said that about 80 per cent of technical information in America is found only in patents (Asche 2017) and that many of these patents are not practically applied in business. It is true that ideas which succeed as a business can be called 'innovation' while an innovative idea is not called 'innovation' if it is not successfully implemented. It seems

that innovation is the result of repeated trial and error with continuous effort and guts. In fact, Michael Joseph, who was the founding CEO of Safaricom Limited, mentioned the reason of M-PESA success as follows:

> It has to do with determination, dedication, passion, trust, brand loyalty, and, most of all, willingness to take the risk of rolling out a massive dedicated and disciplined agency network. (Joseph 2012)

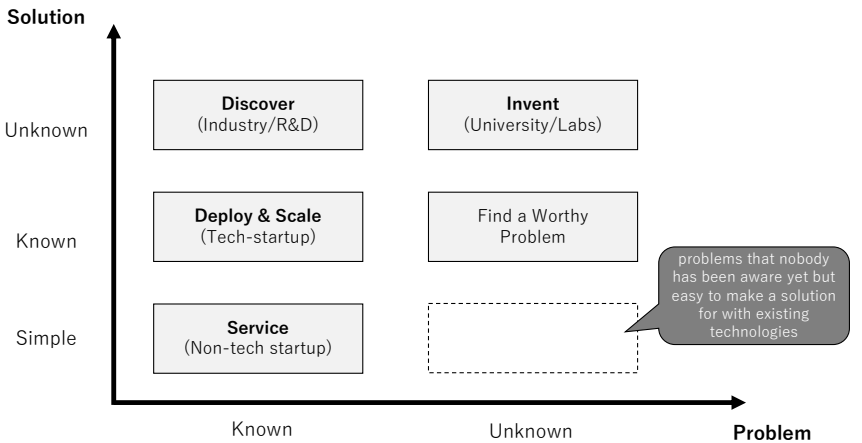
Even if a disruptive innovation like M-PESA seems to stem from a genius idea and technological breakthrough, it actually consists of *Kaizen*-type tremendous effort and continuous improvement (=incremental innovation) with strong leadership and passion.

3.4. Kaizen and innovation are not opposite but integral

As the case study of M-PESA shows, it is true that *Kaizen* contributes to not only incremental innovation but also disruptive innovation. Now let us think more deeply about where and how *Kaizen* can contribute to the entire innovation process. According to the service innovation framework, the first step is to 'Create value.' It is to discover the new needs of a market, in other words, to find out problems worthy enough to be solved. Although this is the very first phase of innovation, *Kaizen* has the potential to contribute to the strengthening of such insights.

Ramesh Rasker (2019) from the Massachusetts Institute of Technology (MIT) Media Lab posted on Facebook an interesting figure outlining the choices of innovators, to illustrate the kinds of problem-solving categories according to levels of solution and problem (Figure 6.9).

Certainly, there are economic and social problems in African countries; but there are also opportunities. The most important opportunity is that it is possible to solve local problems with existing technologies (Ochiai 2019). There are cheap and easy ways to utilize technologies. Many solutions can be created by using mobile and web applications; thus it is not necessary to build a complicated system from scratch. Cloud services provide various kinds of reliable platforms. Even if you are not good at programming, you can easily create web services. In this context, what is more important is to discover the unknown problems and visualize them so as to ideate solutions. The ability to find a worthy problem is critical.



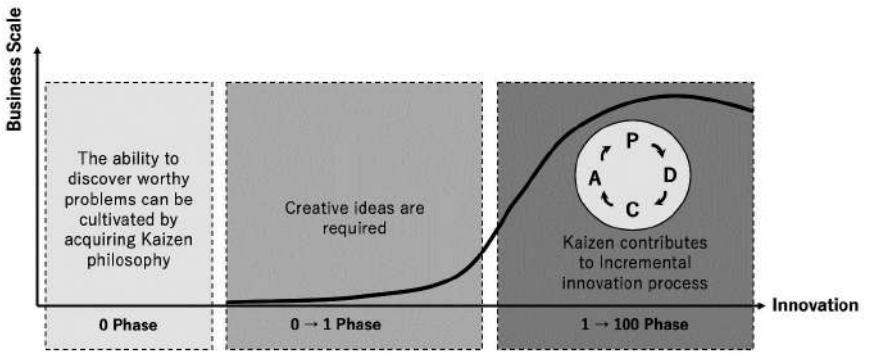
Source: Rasker (2019) with additional information by the author.

Figure 6.9. Choices for Innovators

One of the interesting examples is Haier, the Chinese household appliance manufacturer, whose products are widely available in both developing and developed countries. When Haier observed a farmer in rural China complaining that his washing machine had a problem when he was using it to wash his potatoes, they modified the washing machine design and this company now offers a washing machine that can be used for washing both clothes and potatoes. Furthermore, when Haier noticed that many rural households kept their washing machines outside, they manufactured another model from plastic material so as to prevent it from rusting. Such careful understanding and sensitivity to local conditions, different from its Western competitors, have contributed to Haier's global expansion (Schrempf et al. 2013).

The ability to discover local needs and worthy problems can be cultivated by learning the philosophy of *Kaizen* because it involves a series of quick actions to find out and change something problematic with limited resources. For example, basic *Kaizen* such as 'Repeating why five times' and '*Gemba* visit' are processes that staff can use to think deeply about inconvenient situations. This attitude allows them to find out users' unknown worthy problems and also to attempt to take action quickly without hesitation. Such insights and attitudes can be improved by acquiring *Kaizen* philosophy.

Considering the discussion about *Kaizen* and innovation so far, it is possible to say that *Kaizen* and innovation are not opposite but integral as Figure 6.10 illustrates. In other words, if innovation is not regarded as one-shot breakthrough, but as a series of continuous efforts from discovering a problem to brushing up an innovative idea to be a sustainable business model, *Kaizen* is an integral part of the innovation process.



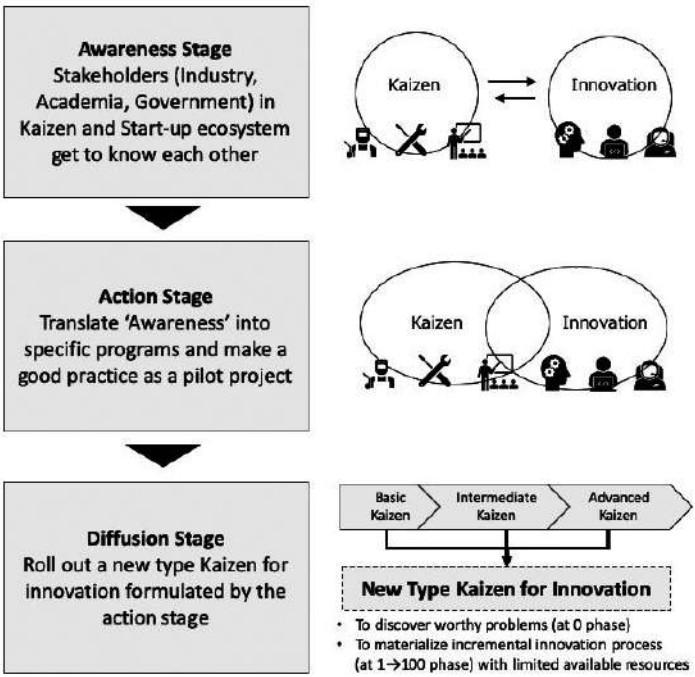
Source: Created by the author based on Maru and Obara (2019).

Figure 6.10. Integral Relationship between *Kaizen* and Disruptive Innovation (Full Version)

4. How to Harmonize the Effect of *Kaizen* for Innovation in Africa?

As discussed so far, it is fair to say that *Kaizen* can contribute to promoting innovation in Africa. Traditionally, *Kaizen* is seen as a set of tools for productivity improvement. However, there is more potential in applying *Kaizen* to promote the innovation process and its output. Finally, in this section, let us think about the last question, 'How to harmonize the effect of *Kaizen* for innovation in Africa?'

This section attempts to answer the abovementioned question by referring the concept of translative adaptation. Based on the translative adaptation approach shown in case studies of Chapter 2, a system to apply *Kaizen* for innovation is proposed which consists of three stages (Figure 6.11).



Source: Created by the author.

Figure 6.11. Approach to Apply *Kaizen* for Innovation

4.1. Awareness raising

First, awareness raising is necessary. It seems that there is a wide gap between stakeholders working or studying for *Kaizen* and innovation. Although some scholars and practitioners are aware of the coherence between *Kaizen* and innovation, there is a general notion that *Kaizen* and innovation is opposite as Table 6.3 shows.

While Chapter 2 indicates the importance of grass-root awareness raising and participation, in order to adapt *Kaizen* to innovation process, this awareness raising should aim at filling such gaps. In addition, as Chapter 2 mentions, the industry-academia-government partnership is also a key element. In this context, it is a good starting point that each stakeholder from industry, academia, and government should reconsider the relationship between *Kaizen* and innovation to create mutual understanding of this through a serious of meetings and discussions.

In addition to understanding the integral relation between *Kaizen* and

Table 6.3. Comparison between *Kaizen* and Innovation

	Kaizen	Innovation
1. Effect	Long-term and long-lasting but undramatic	Short-term but dramatic
2. People	Small steps	Big steps
3. Timeframe	Continuous and incremental	Intermittent and non-incremental
4. Change	Gradual and constant	Abrupt and volatile
5. Involvement	Everybody	Select few champions
6. Approach	Collectivism, group efforts, systems approach	Rugged individualism, individual ideas and efforts
7. Mode	Maintenance and improvement	Scrap and build
8. Spark	Conventional know-how and state of the art	Technological breakthroughs, new inventions, new theories
9. Practical requirements	Requires little investment but great effort to maintain it	Requires large investment but little effort to maintain it
10. Effort orientation	People	Technology
11. Evaluation criteria	Process and efforts for better results	Results and profits
12. Advantage	Works well in slow-growth economy	Better suited to fast-growth economy

Source: Imai (1986, p.25). Cited by Ohno et al. (2009).

innovation, one of the potential goals of mutual understanding is to set *Kaizen* as the necessary competency for innovation. The philosophy of *Kaizen* should be set as core of analog competency that everyone should learn. According to the World Development Report (WDR) 2016 *Digital Dividends*, the World Bank (2016) insists that analog foundation is becoming more and more important when utilizing digital technology. In 2016, the World Economic Forum released the report *The Future of Jobs* and describes in its website the top 10 necessary skills that the future workforce will need in the Fourth Industrial Revolution. The top 3 are: (i) Complex Problem Solving; (ii) Critical Thinking; and (iii) Creativity (World Economic Forum 2016). Similarly, the WDR 2019, *The Changing Nature of Work*, proposes the necessary skillset for workers in the digital era as follows (World Bank 2019, 3):

- Advanced cognitive skills such as complex problem-solving;
- Socio-behavioral skills such as teamwork; and
- Skill combinations that are predictive of adaptability such as reasoning and self-efficacy.

Though digital skills are important, how to utilize digital technology and for what purposes is more important. Since digital technology can replace human beings in conducting simple and easy tasks, what we should do is to find out and set up issues and problems to be solved in this way. While

AI does not do something unless a human being orders to do, human problem-solving skills should be one of the analog competencies required in the digital era. Without such competency, workers who just conduct ordered tasks will be replaced by AI. There is a close relevance between the above-mentioned skillset and the philosophy of *Kaizen*. *Kaizen* enables all workers to discover and solve problems. Even if it is a small activity during the implementation of a PDCA cycle, they are encouraged to have self-efficacy. Moreover, the *Kaizen* approach such as Quality Control (QC) circles fosters this sense of teamwork.

Many governments set national policy to promote innovation, including human resource development, with skillsets such as digital literacy, creativity, problem solving skills, and so on. WDR 2019 also insists on the importance of investment in human capital (World Bank 2019). Setting a curriculum to learn the philosophy of *Kaizen* from primary to higher educational institutions can be one of the valuable measures taken not only for productivity improvement but also for promoting innovation.

4.2. Action stage

The next step is to translate 'Awareness' into specific programs and make good practice as a pilot project. One of the potential programs is to support local start-ups to be a 'producer of innovation.'

Why do many governments pursue innovation? It is because innovation promotes economic growth and development. Currently, some of technological innovations, such as AI, IoT, 3D printing, blockchain, and so on are key drivers for development. In 2019, the African Development Bank issued the report, *Potential of the Fourth Industrial Revolution in Africa*, to grasp the current situation about the readiness for 4IR in Africa. The report also proposes three kinds of scenarios that Africa might consider in the 4IR context (African Development Bank 2019, 17):

- The first would be to maintain the status quo and miss out on the revolution, as Africa did for the previous three industrial revolutions;
- The second would be to bypass other stages of development and leapfrog directly to the 4IR. Even though this path is paved with challenges to be overcome, Africa has more to benefit than to lose from taking the necessary steps to unlock 4IR; and
- The third would be for Africa to become a producer of 4IR technologies.

> This path is, perhaps, too ambitious for Africa as a whole and not foreseeable in the medium term (i.e. within five years).

The report proposes recommendations for related stakeholders based on the second scenario because the first one should be avoided and the third one is too difficult to achieve at present mainly due to lack of human capital.

Yes, this seems a very reasonable choice. The third option, to be a producer of 4IR technologies (this means for Africa to invent brand-new technologies), seems to be very difficult since it requires much time and investment for R&D. However, why not aim at becoming a producer of innovative services with 4IR technologies? While it is very difficult to be a producer of 4IR technologies, it seems much easier to be a producer of innovative services. In comparison with the developed world, there are more local problems to be solved by a solution with existing technologies in Africa. Additionally, there are not so many legacy systems that would be an obstacle to the implementation of new systems in terms of physical infrastructure and regulatory systems in Africa. If local companies improve their capacity of problem-solving (including the ability to find out the worthy problems) and of business development to improve their business ideas to sustainable business models (from 1 to 100), they will be able to be the producer of innovative services with 4IR technologies.

Furthermore, there is potential that their solutions can be sold for developed counties as 'Reverse Innovation.' In the world, there are many examples of 'Reverse Innovation,' in which an innovative product or service created in developing countries are transferred to developed countries (Table 6.4). Africa has the potential to make such innovative services that can also serve people in developed countries.

However, who are the owners of such reverse innovation so far? The answer is not local companies but large multinational companies. For instance, in India, Philips and General Electric (GE) are among the top patent filers. In 2015-16, Philips filed the second highest number of patents by foreign firms (949), while GE was fifth (446) (Cory 2017). The term 'Reverse Innovation' is widely recognized by the book written by Vijay Govindarajan and Chris Trimble (2012). This book introduces many examples of reverse innovation. But, most of them are made by big companies such as GE, Proctor and Gamble (P&G), EMC Corporation,

Table 6.4. Examples of Reverse Innovation

Company	Overview
General Electric (GE) Healthcare	While the price of a general electrocardiogram (ECG) machine is from 3,000 to 10,000 USD in developed countries, GE Healthcare produced the portable ECG (MAC400) for 40,000 Rs (about 500 USD) by squeezing the features in India. It was also sold to rural hospitals in America.
Proctor and Gamble (P&G)	P&G produced a new sanitary napkin (Naturella), which has different characteristics from P&G's major product in developed countries. But it was successfully sold in Mexican markets and in more than 30 other countries.
Unilever, Nestle	Unilever and Nestle discovered that many customers in developing countries could not afford to buy standard sizes of products such as coffee, toothpaste, or shampoo, but could afford to buy a single-use-package with cheaper price. The same approach also works well for low-income consumers in developed countries.
Philips	Philips developed a software solution named 'Mobile Obstetrics Monitoring (MOM)' It allows community healthcare workers to conduct antenatal risk stratification, receive diagnostic assistance, and assess a patient's progress via a mobile device to improve maternal care in rural areas. It was also used in Indonesia and is expected to be sold in other countries.
Coca-Cola	Coca-Cola developed a solar-powered cooler box called the 'eKOCool' to sell Coca-Cola in rural India, where electricity supply is unstable. eKOCools were sold in India and around the world in many situations where electricity is not available, such as in the case of disasters and outdoor activities

Source: Elaborated by the author, based on Govindarajan and Trimble (2012), Ramamurti (2012), Sengupta (2012), and Cory (2017).

Nokia, and so on. Even the most famous innovation in Africa, M-PESA, was initiated by British telecom giant, Vodafone, which has a 40 per cent share of Safaricom. Although the poor people in developing countries (Base of the Pyramid) can receive good-enough products and services which solve their problems, who get the most profit? The answer is big companies in developed countries.

Similarly, in Africa, some innovative services are also managed by foreign companies such as ZIPLINE from America and Babylon Health from the UK in Rwanda. The African market has a good advantage in generating innovative services because of plenty of needs, no strict regulation, and no legacy system compared to developed countries. Large multinational companies are also interested in collaboration with African start-ups. For example, a research project supported by the United States Agency for International Development (USAID), IBM Research, SweetSense, Inc. and other partners has been implemented in Kenya and Ethiopia to utilize new technology such as IoT sensor and blockchain models for underground

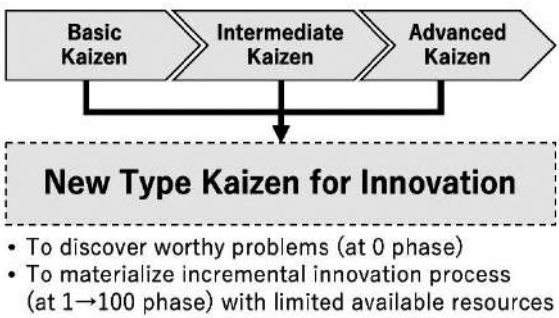
water management. IBM has a strategy that the experience in Africa will also be used for ground water management in California (IBM 2019).

This situation seems welcome at a glance. But, is this the best scenario for Africa? Of course, collaboration with multinational big companies is one of the possible strategies to secure the necessary investment and financial resources to boost local economies. Thus, many policy documents recommend generating foreign direct investment. One of the goals of start-ups is buy-out to such big companies. However, it is also necessary to incubate local enterprises strong enough to elaborate their services to scale up on their own so that they will be able to expand their market toward other countries including developed ones in the long run. It should be local companies that can find out local problems that multinational huge companies have not become aware of yet, but are easy to make a solution for with existing technologies. 'Reverse Innovation' should be handled by African local companies not by multinational big companies.

Nevertheless, there will be still a lack of capacity in local start-ups to elaborate their services to be sophisticated enough to scale up even if they have innovative business ideas. To realize the best scenario, governments should implement human resource development as well as capacity building for start-ups. Although many African governments have both a policy to strengthen national innovation ecosystems and to improve the productivity of SMEs (some countries have already introduced *Kaizen* for this purpose). However, both are not closely integrated. *Kaizen* should be integrated into national innovation ecosystem initiatives. For example, the innovation process consists of: (i) finding problems; (ii) applying technology; and (iii) brushing up. Here, (ii) could be done by utilizing the technology and funds of large multinational and/or foreign companies. But (i) and (iii) should be led by African companies; (i) can be promoted by improving the core competency including *Kaizen* philosophy as mentioned in section 4.1. Then, (iii) is incremental innovation for customizing and localizing technologies by developed countries to fit the local context, and *Kaizen* can be effectively utilized. Referring to Chapter 2, possible activities in the action stage are the establishment of training and consulting programs for start-ups and to implement some trial projects to apply them with intended stakeholders. JICA may be in a good position to support such a pilot program to formulate good practice in innovation creation by integrating *Kaizen* and national innovation ecosystems because JICA has implemented projects in both fields in several African countries.

4.3. Diffusion stage

Thirdly, the final step is to roll out good practice and lessons learned from the action stage. Through communication and co-working for some trial projects between the stakeholders of *Kaizen* and innovation, there may be ideas about a new type of *Kaizen* for innovation, within which new indigenous standard training and consulting programs can be elaborated (Figure 6.13). For instance, it is not reasonable to teach all the practical methods of *Kaizen* for promoting innovation because some of them are too specific for the manufacturing process at the factory level. For example, Toyota established the Kanban and Just in Time systems based on the philosophy of *Kaizen*, which are suitable for manufacturing companies where the improvement of the production process is critical. For different business fields and contexts, there should be customized and localized *Kaizen* methods. A new type of *Kaizen* may be formulated from a variety of methods and tools among basic, intermediate, and advanced *Kaizen*.



Source: Created by the author.

Figure 6.13. Formulation of New Type *Kaizen* for Innovation

At this stage, what is important is not only to formulate new types of *Kaizen* but also to ensure that there is national commitment and appropriate institutional infrastructure to disseminate them to develop the capacity of start-ups to promote innovation. As Chapter 2 indicates, national commitment and institutional infrastructure are indispensable.

5. Conclusion

5.1. Summary of the discussion

This chapter reconsidered the relationship between *Kaizen* and innovation

in the context of Africa. There are different opinions related to whether and how *Kaizen* promotes innovation. This chapter revealed that the most suitable type of innovation in Africa is the service, incremental, and disruptive innovation. Then, it discussed how *Kaizen* can contribute to promoting such innovation in two ways. First, disruptive innovation also involves incremental innovation within itself, and *Kaizen* contributes to this incremental innovation process during the period of business development. Second, the first step of innovation is to discover worthy problems and this ability can be cultivated by acquiring the philosophy of *Kaizen*. So, we can conclude that *Kaizen* and innovation are not opposite but integral to each other. Finally, the way to harness the effect of *Kaizen* for innovation in Africa was proposed based on the translative adaptation approach.

5.2. Way forward

In Japan, there are more companies that have lasted over 50 years than in any other country. These companies have been continually transforming to accommodate necessary changes required by the world, such as change in economy, society, and technology. The philosophy of *Kaizen* is not only to respond to changes but also to influence approaches to change such as new ways of thinking, ways of organizing and operating production, marketing, managing business, and so on. It is one of the useful ways for companies as well as nations to evolve and develop as Charles Darwin's theory of evolution indicates:

> It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change. (Charles Darwin)

Recently, the emerging technologies, especially the 4IR technologies, are rapidly developing. Africa has advantages in utilizing such advanced technologies because there is no legacy system and no strict regulations that are obstacles to the introduction of new technologies. Reviewing the dissemination pace of mobile phones and mobile money, Africa has the potential to be an early adapter in utilizing new technologies in new ways. In fact, some African countries attract western companies as a 'sandbox.' In Rwanda, for instance, the government encourages digital services, and then the regulatory testing environment (which is called 'sandbox') is provided for start-ups and companies where experimental activities are

allowed. Since African countries have various social issues and a lack of public and private services, there are more business opportunities than in developed countries.

Africa is the place where more and more businesses will be developed. Even if new technologies are invented in developed countries, they may not benefit those living in developed countries so smoothly. This is because they have legacy systems and obstacle regulations even though their well-developed infrastructure and available resources may be advantages for developed countries when trying new ideas. Additionally, they do not have many worthy 'sexy' problems to be solved. Please imagine which one is more worthy, to develop a new service to squeeze profit for the rich in Japan, or to provide better medical treatment, education, agricultural productivity, and so on in Africa. Considering the earth as one ecosystem, Africa can make the most use of her advantages and benefit from new technologies as a place of such worthy problems, in other words, new business opportunities.

However, without human resource development to equip the people with ability to discover worthy problems and ideate solutions, most of the profit of new businesses is taken up by giant multinational companies. In the near future, it will be necessary for Africa to get out of its current position as a 'sandbox.' To learn and digest the philosophy of *Kaizen* as well as Japanese companies' experience of long-term survival can contribute to such human resource development. *Kaizen* is generally considered to be methods for productivity improvement. However, it has the potential to be used widely for human resource development and to lead innovation as well as methods for start-ups to promote indigenous innovation. Innovation is not created by PhD holders only but by the people in the field, and investing in R&D is not the only way to promote innovation. It is important to consider placing *Kaizen* into the national innovation policy, especially the philosophy of *Kaizen* as one of the necessary competencies for innovative personnel.

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