



CHAPTER 1

Overview

Akio Hosono, John Page, and Go Shimada

1 INTRODUCTION

Productivity and quality are critical to success in international markets and, in particular, to entering global value chains (GVCs). Yet, despite a growing body of research on managerial capital, we still do not fully understand how to improve productivity and quality in the private and public sectors in developing countries. *Kaizen* is a widely adopted practice developed in Japan to improve productivity and quality, but empirical studies analyzing its effectiveness in developing countries—especially in Africa and South East Asia—are limited. This book presents a collection of essays on efforts to introduce *Kaizen* to developing countries and use it to enhance productivity and quality in both small and large firms. Our

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objective is to give readers some new insights into how *Kaizen* can play a role in making developing countries more globally competitive.

The book is structured in the following way. Following this introductory chapter, Chaps. 2, 3 and 4 take up how *Kaizen* addresses three important issues in contemporary development policy—industrial policy and firm capabilities, creating a learning society and dealing with income inequality. The rest of this book consists of three parts: (1) introducing and implementing *Kaizen*; (2) the effectiveness of *Kaizen* in large companies; and (3) effectiveness of *Kaizen* for micro, small and medium enterprises. Part 1 presents three case studies of how *Kaizen* has been introduced and disseminated in developing countries. Part 2 addresses the impact of *Kaizen* on the performance of larger companies, including its role in efforts to upgrade firms' position in global value chains. The final part of the book consists of three chapters that assess the effectiveness of *Kaizen* in micro, small, and medium enterprises (MSMEs). Our introduction follows the same structure as the book.

2 DEFINING KAIZEN

There is a consensus among experts, practitioners, and academics regarding a number of intrinsic attributes that define *Kaizen*. These central concepts shape our understanding of how *Kaizen* is conceived and how it is used.

2.1 Five Key Attributes of Kaizen

First, *Kaizen* is *an approach to continuous improvement*. This notion comes from the Japanese word *Kaizen* itself and is used by most of the leading institutions engaged in disseminating and implementing *Kaizen* activities such as the Asian Productivity Organization (APO) and the Japan International Cooperation Agency (JICA). Continuous improvement is a core concept of *Kaizen*.

Second, *Kaizen* is *about increasing quality and productivity*. When *Kaizen* was developed, Japanese companies introduced statistical quality control (SQC) in parallel with efforts to improve productivity. Because any reduction in defective products enhances yield rates (known in Japan as *budomari*), more effective quality control (QC) not only improves quality; it also increases productivity. Thus, the principal aims of *Kaizen* are improving quality and productivity at the firm level. Central to this

objective are the elimination of *Muda* (waste), *Muri* (overloading), and *Mura* (inconsistency). These three elements—or “3Mus”—have become central concepts of *Kaizen*.

A defining characteristic of *Kaizen* is that it does not seek to improve productivity through investments in machinery. Rather it does so through reductions in costs—based on 3Mus—making it a low-cost approach to raising productivity, especially for smaller firms.¹ In addition, the elimination of 3Mus improves the safety of workers and reduces environmental burdens. Thus, *Kaizen* may be more comprehensively understood as the improvement of quality, productivity, safety, and sustainability.

Third, in Japan, *Kaizen* developed inclusive and participatory approaches to improving quality and productivity by aligning and adapting statistical quality control and productivity movement methods that were introduced from the United States to a higher level of worker participation. As Shimada argues in Chap. 4, the participatory approach developed in part to reduce confrontations between labor and management. The inclusive and participatory approach constitutes another core element of *Kaizen*.

Fourth, many *Kaizen* tools and methods have developed over the more than half a century of its dissemination and development in Japan. For example, 5S, quality control circles (QCC), and just-in-time (JIT) inventory are well-known *Kaizen* tools and methods, often used synonymously with *Kaizen*. The so-called *Kaizen* mindset, which places an emphasis on teamwork, communication, and learning attitudes—or the *Kaizen* philosophy—is essential for the effective application of the tools and methods.²

Fifth, as *Kaizen* has spread through firms, it has come to be referred to as total quality control (TQC) and total quality management (TQM). The Toyota Production System (commonly called TPS) is one of the most systematic and advanced Japanese TQC or TQM systems. TQM and TPS are not *Kaizen* *per se* but are management systems based on *Kaizen* (or that use *Kaizen*). Some systems that developed outside of Japan, like lean production, are based on TQM and TPS. The fact that *Kaizen* is the basis of such management systems is an important spillover. It has contributed to the design of new approaches in countries outside of Japan.

2.2 The Definition of *Kaizen* Used in This Volume

The first three of the five key attributes of *Kaizen* discussed above are its most important characteristics. With these in mind, we can give a basic, brief definition of *Kaizen*. *Kaizen* is an inclusive and participatory approach to the continuous improvement of quality and productivity.

Our brief definition, however, fails to reflect two of *Kaizen*'s other attributes. If we add them to the definition, we reach a somewhat longer but more complete one. *Kaizen is an inclusive and participatory approach to continuous improvement of quality and productivity, resting on its distinctive philosophy and tools/methods. It forms the basis of multiple management systems, including TQM and TPS, developed in Japan and adapted for use in other countries.*

3 KAIZEN AND THREE ISSUES IN DEVELOPMENT

In this section, we draw on the three opening chapters and on the country-level research to explore how *Kaizen* addresses three major issues in economic development. The first is the role of *Kaizen* in industrial policy and the development of firm capabilities. The second issue is how *Kaizen* contributes to learning by individuals and institutions and to the capacity to learn in society more broadly. The third is how *Kaizen* can contribute to equitable growth. These issues are covered in detail in the essays in Chap. 2 by Page, Chap. 3 by Hosono, and Chap. 4 by Shimada. This section draws on key results from the country-level research to explore *Kaizen*'s contribution in each area.

3.1 *Industrial Policy, Capabilities, and the Learning Firm*

Chapter 2 by John Page analyzes the relationship between industrial policy, *Kaizen*, and firm capabilities—a key determinant of international competitiveness. He argues that industrial policy is finally reaching the development policy mainstream and that one of its major objectives in low-income countries should be to build knowledge in the firm. Traditionally, economists have viewed the firm as a black box, responding to changes in its external environment, as prices and incentives change. Recent work at the intersection between management studies and economics is beginning to pry open the black box and gives us greater insight into how workers and managers impact such critical outcomes as productivity and quality (Sutton 2012).

Productivity is one dimension of capability. The other is quality. Because *Kaizen* is “an inclusive and participatory approach to the continuous improvement of quality and productivity,” it is intrinsically related to building firm capabilities. Page concludes that “*Kaizen* is a promising and uniquely Japanese approach to capability building,” but he cautions that firms often fail to respond to opportunities to raise productivity and qual-

ity due to lack of perception or motivation. Competitive pressure must complement training initiatives, whether based on *Kaizen* or not. Moreover, *Kaizen* is not the only approach to training. Further evaluations of the impact of capability building efforts—ranging from collective action by private firms to structured training programs—will be essential to understanding the costs and benefits of industrial policies targeted at improving firms' performance.

Kaizen supports the learning of capabilities in firms by helping workers and managers to identify and resolve production and quality problems. In their studies of firms attempting to enter and move up the automotive value chains in Mexico and South Africa, Keiji Katai (Chap. 8) and Keiji Ishigame (Chap. 9) provide a number of examples of how *Kaizen* promoted capability building in medium- to large-scale firms. In Mexico, Katai found that in addition to making changes in the production lines targeted under the project, automotive firms expanded *Kaizen* activities to other production lines, leading to internal spillovers, evidence that they applied the knowledge gained to other areas of the enterprise. Katai also found evidence of knowledge spillovers between supplying and purchasing firms. The most successful Mexican suppliers were entering into longer-term partnerships with Japanese buyers that involved the transfer of knowledge to the supplying firm. Ishigame's surveys of firms in South Africa found that *Kaizen* contributed to learning not only in companies that participated fully in the project but also in companies that dropped out and failed to finish. He suggests that by giving workers greater voice, *Kaizen* encouraged learning. Managers noted that as firms implemented *Kaizen*, many operational staff began to identify problems in production and propose improvements in plant-level processes to solve them.

In Chap. 11, Vu Hoang Nam evaluates a *Kaizen* training program for MSMEs in garment production in Vietnam. One key finding of the evaluation was that in addition to the direct impact of training on targeted enterprises, there were important spill-over effects on learning by non-treated firms. The improved management practices that were adopted by participants were also acquired through an informal channel of networking among the proprietors of similar firms. Ackah, Atta-Ankomah, and Kubi evaluate the effect of *Kaizen* training offered to small manufacturing enterprises in Ghana in Chap. 12. Their results show that firms receiving *Kaizen* training had a statistically significantly higher probability of engaging in daily cleaning at the close of work, placing tools in the right place, having a *Kaizen* committee, and having a floor plan than firms that did not introduce *Kaizen*. Workers' suggestions to management for process

improvements, employees' knowledge of the firm's sales targets or policies, and knowledge of the mission of the firm were significantly higher in treated firms. The Philippine experience outlined in Chap. 13 shows a number of similarities with the firm-level learning that took place in Ghana and Vietnam.

The case studies suggest that by including all members of the firm in the process of learning and problem-solving, *Kaizen* promotes the exchange of information between workers, managers, and engineers and helps to develop "learning organizations." However, they also point to a number of lessons with respect to sustainability. Katai and Ishigame conclude that in larger firms, leadership from top management is essential to keep workers and managers moving in the same direction. Among MSMEs, smaller size may promote closer engagement, but in Ghana and Vietnam, managers reported problems with the attitude to work and discipline of workers—the majority of whom had little prior organized work experience.

3.2 *Kaizen and the Learning Society*

Noman and Stiglitz (2017) argue that "perhaps the most important 'endowment' of a country [is] institutions and learning capacities that [are] embedded in local institutions." In Chap. 3, Akio Hosono examines the learning dimension of *Kaizen*, emphasizing that it differs from other approaches to achieving better quality and productivity because of its distinctive focus on inclusive and participatory learning. *Kaizen*, total quality management (TQM), and related approaches contribute to growth—and in particular to high-quality growth—by enhancing learning capacity, an essential endowment for industrial transformation.

Many *Kaizen* tools and methods have developed over more than half a century to address the three productivity dimensions of cost, quality, and speed. "The core concept of *Kaizen* is to eliminate *muri* (overloading), *muda* (waste), and *mura* (inconsistency) from the worksite through efficient utilization of labor, materials, and equipment" (APO 2015, 10). These approaches require participation and learning by all. Hosono argues that *Kaizen* differs from other approaches to achieving better quality and productivity—especially those based on monetary incentives or sanctions—due to its distinctive focus on inclusive and participatory learning.³

The case study evidence shows that *Kaizen* changes the mindset of managers and workers, fosters personnel who can think and act for

themselves, and promotes teamwork by encouraging team-based problem-solving (JICA 2016). Ishigame's interviews with workers and managers of automotive suppliers in South Africa in Chap. 9 show that 88 percent of the respondents believed that *Kaizen* had a positive impact on learning. Respondents indicated that major changes took place with introduction of *Kaizen*. As operators participated in training, management and engineers encouraged them to express their opinions. Production workers learned to think for themselves and take the lead in improving factory operations. Managers and engineers, on the other hand, learned the importance of involving workers in quality and productivity improvements.

In Chap. 5, Jin also takes up the relationship between *Kaizen* and learning. He finds that the changes of mindset observed in workers in Ethiopia consisted of enhanced teamwork, communication, and learning attitudes. Jin argues that these changes are the result of collective activities of *Kaizen*, such as 5S, quality control circle (QCC), and *muda* elimination. He argues further that *Kaizen* addresses not only the development of the technical capacity of workers and management but also the development of “core capacity.” Core capacity includes the ability to commit and engage, to identify needs and key issues, to plan, budget, execute, and monitor actions, and, most importantly, to acquire knowledge and skills.

Core capacity is closely related to employability. In Chap. 7, Suzuki and Sakamaki look at *Kaizen*'s role in employability training in Ethiopia and South Africa. They note that there is no unified definition of what specific skills are core employability skills, but that skills and abilities that consistently appear in employer surveys fall into four categories: learning to learn, communication, teamwork, and problem-solving. These skills are what many company managers expect from workers when implementing *Kaizen* activities.

In Chap. 10, De Sousa, Canêdo-Pinheiro, Cabral and de Sousa Ferreira suggest that in Brazil, *Kaizen* has played an important role in innovation. They find that both product and process innovation increases following the implementation of *Kaizen*. In their view, these innovations—with a lag of some years—eventually impact productivity. This is an important, but somewhat controversial finding. The relationship between *Kaizen* and innovation deserves special attention. We need to understand how *Kaizen* differs from the widely accepted notion of “innovation.”

Masaaki Imai's view is well known and clearly highlights the main characteristics of *Kaizen*. He argues that effect of *Kaizen* is long-term and long-lasting but undramatic. “Innovation,” on the other hand, is short-term

and dramatic. *Kaizen* is based on group efforts and a systems approach; “innovation” is based on individual ideas and efforts. *Kaizen* requires little financial investment but great effort to maintain momentum, while “innovation” requires large financial investments (Imai 1986).

However, there are many definitions of innovation. Innovation can be incremental (JICA 2018, 9 of Part 1), and more recently some experts have associated *Kaizen* with incremental innovation (JICA 2018, 10 of Part 1). The *Kaizen* mindset and many *Kaizen* tools can be considered innovation inputs, enabling firms to take innovative actions, experiment, adopt new technology, and hence achieve innovation outputs.⁴ The MIT Commission on Industrial Productivity notes that the cumulative effect of successive incremental improvements and modifications to established products and processes can be very large and may outpace efforts to achieve technological breakthroughs (Dertouzos et al. 1989).

3.3 Kaizen and Equitable Growth

Chapter 4 by Go Shimada analyzes the implications of *Kaizen* for inequality, one of the most important global issues we face today. This chapter draws on Japanese experience to argue “*Kaizen* is essential knowledge, a missing piece to achieve equitable growth.” Japan introduced *Kaizen* at a time when labor relations were very conflictive. In order to secure worker participation in a process designed to improve productivity and quality, firms adopting *Kaizen* committed themselves to share the profits derived from such improvements equitably between labor and management. Several key features of the emphasis on equity, such as life-time employment and the growth of company-specific labor unions—most of Japan’s labor unions are not organized by industry—increased employee loyalty to firms and strengthened firm-level competitiveness. The equity orientation of *Kaizen* was not a technological innovation. It was a social innovation that contributed to achieving economic growth and equality. Shimada argues that both developing and developed countries can adapt the social innovation embodied in *Kaizen* to address inequality.

As Shimada points out in Chap. 4, in most cases, productivity growth means that firms need fewer people to produce the same output. This is not the usual experience under *Kaizen*. Because *Kaizen* requires the long-term commitment of both managers and workers to implement behavior change, it has the potential to improve labor-management relations. In

other words, *Kaizen* seeks to maximize long-term social return rather than short-term private return.

Our country studies paint a mixed picture of *Kaizen*'s impact on employment. In Ghana (Chap. 12), Ackah, Atta-Ankomah, and Kubi found that *Kaizen* firms increased average employment relative to non-*Kaizen* firms. Beyond the impact on the number of jobs, they also found managers reporting that workers' attitude toward work was more positive in treated firms. On the other hand, De Souza, Canêdo-Pinheiro, Cabral and de Sousa Ferreira (Chap. 10) found that in Brazil the employment impacts of *Kaizen* were mixed. Firms implementing *Kaizen* tended to hire more total employees, because production expanded compared to those not implementing *Kaizen*. More detailed analysis revealed, however, that *Kaizen* increased the total number of workers and the number of R&D-related workers, while reducing the number of workers on the production line. They also found that the expansion of employment was biased toward high-skilled workers.

Other case studies—Ethiopia, Mexico, the Philippines, South Africa, and Vietnam—do not address employment but give us some insights into how *Kaizen* impacts worker-management relations. It is a mixed picture. In Vietnam (Chap. 11), Nam et al. found high turnover rates and low worker commitment to be key problems. Set against that, managers reported not knowing how to motivate workers. In contrast the case study of the Philippines (Chap. 13) by Raneses et al. found that *Kaizen* empowered workers to assume a greater role in the operations of the firm. Managers promoted teamwork and introduced plant-level changes based on workers suggestions. In Ethiopia (Chap. 5), Jin observed that once workers were convinced of the usefulness of *Kaizen*, they used it even in their homes. His interviews of managers, however, found that workers participation in *Kaizen* represented a challenge to its sustainability. Ishigame in Chap. 9 finds similar difficulty with workers' attitudes and attributes the difficulty in changing mindsets among workers to the structure of labor-management relations in South Africa. Although it was a condition for firms to receive *Kaizen* support under the JICA project not to reduce the number of employees, workers refused to accept many proposed changes due to the perception that they would increase their burden of work.

How should we interpret this mixed picture? Japan's experience suggests that improving manager-worker relations takes a long time. Our case studies of Vietnam, Ethiopia, and South Africa show the same pattern. In

each case, changing the mindset of managers and workers took time, but the change resulted in an improvement in labor-management relations. This improvement is essential for the sustainability of *Kaizen*, and if the change is successfully sustained, *Kaizen* will bring social innovation to the firm.

4 INTRODUCING AND IMPLEMENTING *KAIZEN*

Today, *Kaizen* is practiced in many countries. Part 1 of this volume focuses on case studies of how *Kaizen* was introduced and disseminated. Both the public and private sectors have introduced and disseminated *Kaizen*, sometimes working together. The country studies find that success in implementation depends on the development of specialized agencies, the level of industrialization of the economy, the presence of foreign firms, and the level of participation in global value chains (GVC).

In countries such as the United States and Japan, initiatives by the private sector were decisive. In Japan, manufacturing companies were strongly motivated first by the urgent necessity to become competitive in the world market after World War II (in the 1950s and 1960s) and later by the necessity to address challenges caused by the oil crises of the 1970s and 1980s.⁵ In the US automobile industry, intense competition from Japan was one of the most important triggers to introduce new management systems, including total quality management and lean production, in the 1980s.

Among Southeast Asian countries, Singapore was the first to introduce *Kaizen*. The government led the process of nationwide introduction and dissemination of *Kaizen* in the 1980s. Later as public-private institutions directly charged with this process developed, the public sector's engagement diminished. In the other "ASEAN 5" countries (Indonesia, Malaysia, the Philippines, and Thailand), the introduction of *Kaizen* has been led by both public and private initiative, depending on the country context. Most other ASEAN countries have followed a similar trajectory. In North Africa, Tunisia and Egypt were pioneers in introducing *Kaizen* in the mid-2000s, while in sub-Saharan Africa, Ethiopia was the first country that promoted *Kaizen*, beginning in the late 2000s.

4.1 *A Government-Led Process in Ethiopia*

In Chap. 5, Jin analyzes how Ethiopia, a country at a very early stage of industrial development, introduced *Kaizen* from scratch. Ethiopia has few

foreign firms and little participation of local firms in GVC. The Ethiopian case is relevant to understanding the process of introducing *Kaizen* when the concept is almost totally unknown. The process began with a pilot project, followed by sequential programs of scaling-up. In 2009, the Ministry of Industry created a *Kaizen* Unit with ten staff to test its effectiveness in the manufacturing sector. Once *Kaizen*'s effectiveness was established, the Unit expanded in 2011, to become the Ethiopia Kaizen Institute (EKI) with sixty technical staff. EKI provided training to 68,954 trainees and established 9658 *Kaizen* Promotion Teams (KPT)—a customized version of the quality control circle (QCC)—in 473 institutes in Ethiopia from 2012/2013 to 2016/2017.

As the EKI scaled up the introduction of *Kaizen* programs to a wider range of targets, it also communicated with sector-specific industrial development institutes (for example in the textile, leather, and metal industries) in order to mainstream *Kaizen* training. In 2014, the government established the National *Kaizen* Council chaired by the Prime Minister and started creating regional *Kaizen* institutes to strengthen dissemination across the country. In addition, the government incorporated mainstreaming *Kaizen* into its five-year national development plan, the Growth and Transformation Plan II. Recognizing that *Kaizen* could also play a role in the public sector, the government changed the supervising ministry of EKI from the Ministry of Industry to the Ministry of Public Service and Human Resource Development in 2015, and then to the Civil Service Commission in the Prime Minister's Office in 2018.

In more than half of the workplaces, the *Kaizen* methods taught were 5S, KPT, and Muda elimination, which are basic *Kaizen* tools that can target several bottlenecks in the production process. These activities do not require high-level technical skills, but the participation of people in all levels of management, supervisors, and workers is essential. Jin conducted interviews intended to analyze how practitioners in companies understood the impact of introducing *Kaizen*. More than half of respondents ranked: (i) changing the mindset of workers, (ii) improving the flow of materials, (iii) greater efficiency of machinery, (iv) better communication flow, (v) increased technical skills of workers, and (vi) leadership by management in descending order as the major impacts of introducing *Kaizen*.

Eighty-seven percent of the respondents chose “the mindset of workers” as the feature that most changed in the workplace. The most common three changes in mindset reported were better teamwork, communication, and learning attitudes, followed by self-confidence and activism.

Punctuality and obedience ranked relatively low. Jin concludes that the egalitarian approach of *Kaizen* was a major factor in its successful dissemination.⁶ He concludes “people do not want to be treated like a disposable workforce by employers through a reform process. This point has critical importance in societies with limited dynamism in labor markets, such as Ethiopia, because it is difficult to find new job opportunities once people are dismissed. Workers don’t appreciate any reform activities that affect their job security negatively, which is the other side of the coin of productivity improvement.”

4.2 Diverse Dissemination Profiles in Southeast Asia

In Chap. 6, Homma describes how government, public-private organizations, and the private sector contributed to the introduction and dissemination of *Kaizen* in three ASEAN countries, Malaysia, Indonesia, and Myanmar. In Malaysia, *Kaizen* and associated approaches were introduced in 1983 through the National Productivity Center (NPC)—later renamed the Malaysia Productivity Corporation (MPC)—under the “Look East Policy,” a government initiative to learn from the experiences of Japan.

Having introduced *Kaizen*, MPC/NPC adapted *Kaizen* tools to suit the Malaysian context; 5S was adapted and renamed “Quality Environment” and QCC “Innovation and Competitiveness Circle” (ICC). In Malaysia, *Kaizen* has generally been integrated into a comprehensive productivity improvement system, together with total quality management (TQM) and related approaches. Homma summarizes MPC’s strengths as follows: (i) a strong mandate to lead productivity improvement in Malaysia, (ii) appropriate and timely adaptation of MPC’s function to adapt to changing requirements, (iii) customization of foreign practices such as *Kaizen* to the Malaysian culture, and (iv) a wide variety of approaches designed to deliver services efficiently.

In Indonesia, the private sector played a significant role in introducing *Kaizen*, and it has been actively disseminating *Kaizen* mainly through two channels: (i) Japanese manufacturers have introduced local suppliers to *Kaizen* via their supply chain management systems and (ii) private sector organizations have implemented productivity- or quality-related programs and training. The Directorate General of Training and Productivity

Development under the Ministry of Manpower and Transmigration acts as Indonesia's National Productivity Organization, and has contributed to *Kaizen* dissemination as well.

The private sector has occupied a more central role in disseminating *Kaizen* in Indonesia than in Malaysia. The private sector supply chain (customer companies and supplier relationships) effectively disseminates *Kaizen* by providing information, services, and support. Homma finds that a company's engagement in *Kaizen* either on its own initiative or with information, services, and support from its customers through its supply chain increases labor productivity.

Myanmar, like Ethiopia, is a latecomer. *Kaizen* dissemination is still at an early stage, but there have been some attempts to introduce *Kaizen* in the private sector. The Myanmar Productivity Center (MPC) was created in 2016 as a small unit in the Union of Myanmar Federation of Chambers of Commerce and Industry (UMFCCI) with the support of the Japan Productivity Center (JPC).

Homma highlights two factors that help to determine whether government or the private sector takes the lead in the introduction and dissemination of *Kaizen*—the prominence of GVCs in the economy and the level of institutional quality. In Indonesia, a deep, long-lasting, and firmly established supply chain structure was already in place. Indonesia has the largest population in ASEAN and its market potential is huge. For that reason, almost all major Japanese automobile assemblers established factories under joint venture agreements and their presence provided impetus for *Kaizen* development along the supply chain. In Malaysia, a more centralized economy with stronger public institutions, the government under the Look East Policy took the initiative to develop a professional governmental body (Malaysia Productivity Corporation) which has become a leading productivity organization. Although Japanese car manufacturers contributed to *Kaizen* dissemination in Malaysia, they had less impact, in part due to the national car program.

4.3 Developing the Employability of Youth Through Kaizen

A new approach to introducing *Kaizen* is through training to enhance students' core capacities in vocational education and training (TVET) institutes or universities. In Chap. 7, Suzuki and Sakamaki assess the role of *Kaizen* in enhancing employability. Core employability skills fall into four broad categories: learning to learn; communication; teamwork; and

problem-solving. These attributes are what many company managers expect from workers, and many Japanese companies use *Kaizen* to develop their workers' capabilities.

Ethiopia has expanded the number of TVET institutions from 17 in 1996/1997 to 505 in 2011/2012, and *Kaizen* has been incorporated into the Ethiopian TVET curriculum since 2012. The results of a survey conducted by Suzuki and Sakamaki confirmed that the *Kaizen* course fosters learning to learn (self-confidence, self-awareness, and willingness to learn) and teamwork. The survey also shows that *Kaizen* has had an impact on the mindset of students. Awareness toward learning to learn, especially self-awareness and willingness to learn, was higher for those students who had received *Kaizen* training in TVET.

South Africa has implemented Employability Improvement Training in universities to improve students' employability. JICA's Employability Improvement Project (EIP) uses *Kaizen* to address employability issues. Suzuki and Sakamaki surveyed a sample of recent graduates of the program and found positive results of the training on seven core employability skills. These included changes in critical/logical thinking, teamwork and communication, self-management, and identifying and solving problems. Students had more difficulty in demonstrating leadership and creativity, perhaps as a result of the structure of the training.

4.4 Summing Up

The experiences of Ethiopia and Myanmar suggest that an active government role is important when *Kaizen* is not widely known, FDI is limited, and local companies do not participate in GVCs. In other circumstances, a private sector-led process can be effective. In both cases, public and private collaboration can facilitate the introduction of *Kaizen*. An active government role may be particularly important when there is strong distrust between workers and employers regarding the distribution of benefits from any increase in productivity.⁷ The main site of learning and implementing *Kaizen* has been at workplaces (factory floors), and the main pathway of introducing *Kaizen* has been training managers and employees and providing advice at site. More recently, the introduction and dissemination of *Kaizen* through formal education, such as TVET and universities, has proved effective in enhancing the employability of younger workers.

5 THE EFFECTIVENESS OF *KAIZEN* IN LARGE COMPANIES

Initially pioneered in large manufacturing enterprises—where Toyota remains one of its foremost exponents—*Kaizen* spread through the manufacturing sector in Japan during the period of high economic growth after World War II. Many of *Kaizen*'s early adopters were larger firms. Today, as reflected in the studies in this book, *Kaizen* has found its way into training for micro, small, and medium enterprises (MSMEs) and even into the public administration in developing countries. In this section, we examine three country case studies of the impact of *Kaizen* on larger scale firms in middle-income countries.

5.1 *Moving Up the Value Chain: Mexico and South Africa*

The 1990s and 2000s witnessed an explosion of complex value chains spanning the globe. Labor costs drove many decisions about the location of production, but today only 18 percent of goods trade involves labor-cost arbitrage—defined as exports from countries with GDP per capita one-fifth or less than that of the importing country.⁸ Lead companies in global value chains, however, still require suppliers to deliver high-quality inputs at competitive prices. Productivity and quality depend in turn on the knowledge possessed by the individuals who make up the firm. *Kaizen*'s goal is to help enterprises make higher quality products, reduce costs, and achieve timely delivery through continuous collaboration between managers and workers. Two of our country studies assess the effectiveness of *Kaizen* in helping domestic suppliers integrate into the automotive value chains of Mexico and South Africa.

Since the ratification of the North America Free Trade Area (NAFTA), Mexico has attracted major global carmakers, which use it as a base for export to the US market. In Chap. 8, Keiji Katai examines the effectiveness of a *Kaizen* training program designed to increase the integration of domestic Mexican suppliers into the automotive value chain. From 2012 until 2015, JICA supported supply chain development between Japanese automakers and domestic Mexican parts supplying firms. *Kaizen* experts with experience in the automotive industry conducted diagnoses of each firm, set targets for improvement in collaboration with buyer firms, and supported implementation for one year. Typical *Kaizen* interventions were 5S, reducing defective product ratios, improving job throughput, and reducing down time and inventory.

Twenty-seven domestic firms engaged in or wishing to enter the value chain received training. Katai examines the impact of the training on changes in the position of seventeen firms in the GVC and attempts to relate these changes to changes in their production capabilities. He defines the stages of participation in the value chain as ranging from the non-supplier stage (stage 1) to the level of global partner supplier (stage 6). Movement from stages 1 to 6 represents progress by domestic firms in upgrading their position in the value chain. Lead automotive firms rank suppliers based on quality, cost, and delivery (QCD). Higher level suppliers (stages 5 and 6) develop new products in collaboration with the buyer or collaborate with the Original Equipment Manufacturer (OEM) to supply and develop products for global markets.

Using information from both supplier firms and purchasing firms, Katai attempts to associate changes in lead firm's evaluations of suppliers before and after *Kaizen* training with measures of productivity and quality. He measures quality by changes in defective product ratios and productivity by reductions in mold-changing times. In the automotive industry, quality is assessed by the number of defective parts per million (PPM). After the intervention, the defect rate in firms receiving training declined substantially. Of fifteen firms, twelve firms reduced their defect rates to less than 100 PPM, lower than the average for domestic automotive parts makers in Mexico. He also finds that low defect rates are positively associated with lead firm's evaluations of quality.

Reduced mold-changing time enables firms to produce products with minimum machine stoppage and improve productivity. Each auto uses about 30,000 parts, and manufacturers carefully control assembly of each model to minimize inventory. Parts makers are therefore required to adjust production volumes of individual parts weekly. This creates frequent changes of molds, and each change can consume hours. The JICA project attempted to reduce mold-changing times. Katai does not find a clear and direct relationship between improved productivity, as measured by reduced mold-changing times, and buyer firms' evaluations of cost.

He does, however, find some evidence of a positive relationship between lead firms' evaluations of QCD levels after *Kaizen* training and the supplier firms' position in the GVC. Of seventeen supplier firms, eight (47 percent) improved their position in the supply chain, five (29 percent) maintained their position, and four (24 percent) experienced a deterioration. Further, there is a positive relationship between supplier firm positions in the GVC and business volumes. However, Katai's data are

restricted to the treated group of firms and their corresponding lead firms. As he notes, without information on a control group or on the overall Mexican automotive parts industry, it is difficult infer a causal relationship.

In Chap. 9, Keiji Ishigame attempts to measure the impact of *Kaizen*—popularly known as the Toyota Production System (TPS) in South Africa—on the competitiveness of automotive suppliers. In doing so, he asks an important supplementary question: does the effectiveness of *Kaizen* differ among suppliers, and what factors contribute to these differences? In 2015, JICA launched an Automotive Industry Human Resource Development Project in South Africa. The purpose of the project was to enhance the capacity of human resources in the automotive industry and to improve the productivity and quality of domestic suppliers. The automotive industry is the largest manufacturing sector in South Africa. It is composed of six major vehicle assemblers, thirteen assemblers of heavy and medium commercial vehicles, and approximately 360 component manufacturers.

Under the project, two Japanese experts working with the South African Automotive Industry Development Center (AIDC) trained AIDC trainers and jointly with the AIDC trainers provided technical advice to local suppliers. Eight supplier firms were selected to receive *Kaizen* training. Because one of the goals of the project was to increase the capacity for *Kaizen* training in South Africa, Japanese experts visited the selected supplier firms five to ten days per year jointly with AIDC trainers. In addition, the AIDC trainers independently visited suppliers every two weeks on average. The training program itself consisted of a number of *Kaizen* tools associated with the Toyota Production System. The first stage taught suppliers to implement 5S.

An innovation of the project was that, contrary to normal practice, 5S was used in the initial stages of implementation, to create a foundation for other *Kaizen* activities. In the second stage, trainers and the supplier firms prepared a diagnostic to identify problems in the flow of information and materials. The third stage consisted of JICA experts, AIDC trainers, and the supplying firms jointly developing *Kaizen* activities to improve quality and productivity. The Japanese experts advised not only on 5S but also on the diagnosis of quality and productivity problems.

Ishigame presents three company case studies of impact. In the first case, a layout change significantly improved quality and productivity, with corresponding increases in sales and profits. The firm moved large machinery into correct positions and implemented one-piece flow, thereby

shortening lead times. It achieved increases in quality by moving from batch production to one-piece flow, allowing operators to identify defects in the course of production. In the second case, a company producing textile-based automotive acoustic and trim components introduced gradual improvements to workflow and production processes, based on 5S. Over two years productivity and quality improved, costs were reduced by about US\$1.6 million, and revenue increased by 25 percent with the same labor force. In the third case—a company making plastic injection molding parts—the introduction of a one-piece flow system produced improvements in quality and productivity and reduced production lead-time from 24 hours to 1 hour. With only a limited number of participating companies and no control group, however, there is insufficient evidence to determine whether the project made a meaningful change in the productivity and quality of supplying firms.

The results of the Mexico and South Africa studies are suggestive, but hardly definitive. Small sample size, lack of a control group, and the absence of benchmark data on the automotive sector make it impossible to answer the question of whether *Kaizen* increased the integration of domestic suppliers into complex global value chains. Some qualitative results provide grounds for optimism. One common thread among the successful cases was the level of commitment of senior management and engineering staff to *Kaizen*. Where managers were committed, implementation of such *Kaizen* tools as 5S and continuous flow led to substantial improvements in quality and productivity, and because *Kaizen* engages all members of the firm, it contributed to learning. The Mexico results further suggest that these are key elements enabling domestic firms to break into and move up the value chain.

5.2 Shortening the “Left-Hand Tail” in Brazil

Empirical microeconomic studies repeatedly find that there are large productivity differences among enterprises in quite narrowly defined industries. Even in rich countries, the magnitudes involved are striking. In the US manufacturing, on average a plant in the 90th percentile of the productivity distribution produces about twice as much output of the same product as a plant in the 10th percentile, using the same measured inputs (Syverson 2011).⁹ While poorer countries have some firms that achieve world-class productivity levels, there is also a long “left-hand tail” of poorly performing firms.

In Chap. 10, De Sousa, Canêdo-Pinheiro, Cabral and de Sousa Ferreira evaluate whether *Kaizen* has improved firm-level performance in Brazil, using both quantitative and qualitative evidence. Put differently, they ask if *Kaizen* can shorten the “left-hand tail.” They draw firm-level data from two sources—The Brazilian Innovation Survey (PINTEC) and the Annual Manufacturing Survey (PIA) and construct an unbalanced panel of firms. PIA surveys all manufacturing firms over thirty employees, on average around 30,000 firms annually. In PINTEC, the size threshold is much higher, 500 employees.

The researchers confront the considerable challenge of identifying *Kaizen* adoption. Neither data set includes questions on whether a firm has implemented *Kaizen*. However, the authors use the innovation survey to identify firms that have adopted management practices based on *Kaizen* principles. Examples of management practices using *Kaizen* tools are re-engineering, knowledge management, total quality control, training, and enterprise resource planning. The innovation survey also asks if the firm has introduced new methods to delegate responsibilities and decision-making to workers. Because in *Kaizen* participation by workers is central, the response to this question reflects a second *Kaizen* characteristic. A third strand of *Kaizen* is continuous improvement, which the authors argue should be reflected in continuous changes in management practice. Thus, they classify a firm answering all three questions affirmatively in repeated years as using a *Kaizen* approach. Using these criteria, the authors select a sample of 2541 firms of which some 63 percent are identified as having implemented *Kaizen*. As a counterfactual they choose firms that do not carry out innovations in management practices.

The authors use a number of econometric approaches to assess the impact of *Kaizen* on firm-level productivity, growth, and innovation. They find that *Kaizen* does not improve firm-level productivity, whether measured by labor productivity or total factor productivity (TFP). They do, however, find a robust positive relationship between *Kaizen* and the growth of the firm. Of greater interest is the finding of a positive impact on process innovation. To reduce potential selection bias, they perform a propensity score matching to restrict the group of untreated firms to only those similar to treated firms. Results using only matched firms in the control group indicate that the relationship between *Kaizen* and process innovation remains robustly positive. Comparing similar firms, *Kaizen* increases innovation in Brazilian manufacturing. Interpreting their results as a whole, the authors conclude that the channel in Brazil by which

Kaizen raises productivity may be through its impact on innovation. Because *Kaizen* is an incremental approach, they further conclude, it is possible that the time period between observations in the data is too short to observe this indirect effect.

5.3 *Summing Up*

The results of these studies of the impact of *Kaizen* on larger firms may disappoint its advocates. Small sample sizes and lack of counterfactual evidence limit what we can conclude from the Mexico and South Africa case studies. Clearly, *Kaizen* interventions were perceived by sponsoring managers and engineers as successful. There is also limited evidence of *Kaizen* contributing directly to improvements in quality and productivity. In both countries, the firms that persisted in the implementation of *Kaizen* appear to have moved up the value chain in the automotive sector.

Using a broader sample of firms, research in Brazil leads to similar ambiguity. It fails to find a significant relationship between the introduction of *Kaizen* and subsequent improvements in either labor productivity or total factor productivity (TFP). The authors speculate that this may be the result of observing the firm over too short a time period. More encouragingly, they find a strong relationship between *Kaizen* and process innovation. The firms that practice *Kaizen* in Brazil innovate more than similar firms.

Productivity is not the sole determinant of competitiveness, however. In fact, low wages can in some cases compensate for low productivity, but they cannot compensate for inferior quality. The Brazil surveys fail to tell us anything about quality. In the Mexico and South Africa cases, there is some evidence that quality was the capability most directly impacted by *Kaizen* methods.

6 EFFECTIVENESS OF *KAIZEN* FOR MICRO, SMALL, AND MEDIUM ENTERPRISES

The three essays in Part 3 measure the impact of *Kaizen* training on the performance of micro, small, and medium enterprises (MSMEs) in Vietnam, Ghana, and the Philippines. MSMEs are quite important to the economic growth of low-income countries (for example in Africa) since almost all firms in those countries are of this type. Of course, even in

developed economies most firms are SMEs (small and medium enterprises). The number of large firms among all firms is just 0.3 percent in Japan, 0.3 percent in the United Kingdom, and 0.5 percent in Germany (Shimada 2017). This section summarizes the results of the country studies.

6.1 *Rural MSMEs in Vietnam*

In Chap. 11, Nam, Anh, and Hung analyze the impacts of a *Kaizen* management training program on the management practices and performance of small and medium sized enterprises in a rural village in Northern Vietnam. The research is interesting in two ways. First, as rural areas have more dense social capital, the training impact could spread through their social network. Second, the chapter examines whether *Kaizen* can have impact in rural settings. This latter point is important for countries attempting to achieve balanced economic growth while avoiding excessive urbanization.

Nam, Anh, and Hung choose to focus on the local trainers because the dissemination of *Kaizen* is often constrained by the availability of these resources. Even if a donor such as JICA sends foreign experts, the number of those experts is relatively limited, and the donor cannot continue sending those experts forever. As the authors correctly argue, the role of local trainers and how they can be trained are important unanswered questions. The JICA project sponsored Japanese experts to provide trainer training to five lecturers at Vietnam's Foreign Trade University. Of the five participants, two lecturers successfully completed the program.

The study site was a village, on the outskirts of Hanoi. The main products of that village are blankets, bed sheets, pillows, and bed mattresses, sold in the domestic market. The authors obtained a list of 816 enterprises from the local government office, and selected 195 bedding-related firms (59 registered, 136 unregistered). Applying a stratified sampling method, they randomly selected 32 formal enterprises out of the 59, and 68 out of the 136 unregistered firms. Because they could not collect complete data from three of the firms, the total number of final respondents was 97 enterprises. Firms were provided both classroom training and on-site training. Each local trainer was randomly assigned to the on-site training of treatment firms.

Since the sample size was small, the authors employed a pair-wise matching technique, following Bruhn and McKenzie (2009). The variables

selected for matching were the gender of the owner, sales revenue, and the registration status of the enterprise. The treated enterprises increased the use of *Kaizen* practices significantly, and *ex-post* indicated greater willingness to pay for the management knowledge gained. The authors also found that the local trainers were successful in training micro, small, and medium sized enterprises. This suggests that it is feasible to scale up *Kaizen* training in the future through the use of local trainers.

An important result was that the *Kaizen* training had spill-over effects to non-treated enterprises. Discussion of *Kaizen* within the social network of the enterprise owners (family relatives, friends, and neighbors) in the village led to the adoption of good management practices by untreated firms. The findings are important because they show the possibility of scaling up and spreading *Kaizen* practices and tools to MSMEs in rural areas. Rural social networks may, in fact, encourage the dissemination of good management practices.

6.2 *Raising Manufacturing Productivity in Ghana*

Micro, small, and medium firms are the backbone of Ghana's manufacturing sector. In Chap. 12, Ackah, Atta-Ankomah, and Kubi evaluate a *Kaizen* project to raise productivity in MSMEs. The project has been implemented by Ghana's National Board for Small Scale Industries (NBSSI) in collaboration with JICA since 2012. It provides basic *Kaizen* training on principles and methods such as 5S, waste reduction and visualization, and basic accounting. The NBSSI's Business Advisory Centers (BACs) administer the training. To ensure the continuity and sustainability of the program, Japanese experts train local trainers who, in turn, assist firms independently.

Ackah, Atta-Ankomah, and Kubi focus their analysis on whether the project intervention had any impact on the performance of enterprises. They employ a Propensity Score Matching (PSM) method to examine the average treatment effect of the training (matching variables are educational background of the manager, subsector of manufacturing, age of the manager, and region and legal status of the enterprises). They also use random effects analysis to complement the PSM results. In total, they interviewed 184 enterprises (Treatment firms: 98, Control firms 86) from three administrative regions—Ashanti, Northern, and Brong Ahafo.

The empirical findings are twofold. First, *Kaizen* had a significant impact on the key performance indicators of these enterprises. Specifically, the authors found evidence of a statistically significant impact of the

training on the number of workers, sales, profit, and output of the enterprise. Second, they observed significant differences in behavioral variables—such as workers' attitudes, daily cleaning practices, placing tools in the right places—and process indicators between the treated firms and firms that did not implement the training.

6.3 *A Kaizen-Like Intervention in the Philippines*

In Chap. 13, Raneses, Cainghog, Tamayao, and Gotera take up the case of a program implemented in the Philippines. Their case study is the government initiative known as the Manufacturing Productivity Extension Program (MPEX), which aims to increase the productivity of manufacturing firms by making their products more competitive in terms of price and quality. The MPEX program is a part of the Philippines Development Plan 2017–2022. Firms in the program cover a variety of sub-sectors such as agriculture and food processing, furniture, gifts and holiday decorations, information technology, materials science, metals and engineering, and microelectronics.

While MPEX is not *Kaizen*, the structural foundation of the program is based on *Kaizen* principles. The program aims to assist MSMEs in the manufacturing sector to get higher productivity through improvements in operations. Under the program, MPEX consultants examined major elements of firm operations such as manufacturing processes, materials management systems, and quality control systems. Based on their assessment, the consultants made recommendations in at least three priority areas. After two to three months, the consultants returned to each firm to see if the recommended improvements have been made.

Out of 300 MSMEs in the food manufacturing sector, 177 firms were selected and 64 firms were interviewed after the program. Using PSM, the authors analyzed the matched data using the difference-in-difference regression model. However, they did not find significant differences in the number of workers and sales per worker between treated and untreated firms. With a relatively small sample size there were not enough respondents in every category to give robust statistical results.

To supplement the quantitative work, the authors undertook two detailed case studies, one a bakery and the second a food products producer. In the bakery, the MPEX consultants provided a half-day training on 5S and hygiene methods to employees. One of the *Kaizen* practices introduced by the owner was promoting teamwork through team-based

competitions. The firm also reduced unnecessary procedures in production, making the process faster. *Kaizen* brought a change in the mindset of the workers as well, making continuous improvements possible.

In the food products firm, the MPEX recommendations included changing layout, and contrary to *Kaizen* philosophy, purchasing new machines, which allowed the firm increase productivity and reach the hygiene standards required to access major supermarkets. These changes resulted in a tenfold increase in production and sales. Workers now process orders from clients independently from the owners and keep records. The authors conclude that successful implementation of *Kaizen* depends on the mindset of workers, the enthusiasm of the entrepreneur, and the managerial capital and time management skills of the owner.

6.4 *Summing Up*

As we have already seen, the evidence of the impact of *Kaizen* on large enterprises is mixed. It is the core principle for Toyota, one of the largest firms in the world, but the evidence in other chapters in this volume from Mexico, South Africa, and Brazil is inconclusive. The evidence is more persuasive with respect to micro, small, and medium enterprises. *Kaizen* works for MSMEs in developing countries. This is important not only for business performance but also for improvements in the living standards of workers. The cases of Vietnam and Ghana are of particular interest, because local trainers, initially trained by Japanese experts, conducted both programs successfully. They provide evidence that *Kaizen* can improve the performance of MSMEs and can be implemented by local human resources in a sustainable way.

7 CONCLUSIONS AND POLICY IMPLICATIONS

The country studies in this volume provide a fuller—but not a comprehensive—picture of *Kaizen*. This picture largely confirms the results of other research indicating *Kaizen* has the potential to make an important contribution to efforts to raise productivity and quality in poorer economies. We found evidence in both large and smaller firms that *Kaizen* resulted in productivity and quality improvements and in some cases, that it enabled firms to upgrade their position in global value chains. Our case studies gave multiple examples of *Kaizen*'s role in promoting learning.

Innovation is essential for an economy to grow, and recent literature suggests that *Kaizen* tools are innovation inputs, enabling firms to take innovative actions, experiment, adopt new technology, and achieve innovation. We also found that through its emphasis on continuous participation by all members of the firm—workers and managers alike—*Kaizen* has the potential to improve relations between workers and management. Our case studies and *Kaizen*'s history in Japan suggest, however, that it takes time to establish a win-win relationship between managers and workers through dialogue.

Managerial capital has recently become an object of interest of development scholars and practitioners. How does *Kaizen* fit into public policies directed at building managerial capital in developing economies? Traditionally, economists have viewed the firm as a black box—responding to changes in its external environment. The case studies in this volume take us some distance in opening up that black box. They show that productivity and quality depend on the knowledge and working practices possessed by the individuals who make up the firm, both managers and workers. Put in Anglo-American economic terminology, these are “firm capabilities.” Improved capabilities increase the potential productivity of all firms. *Kaizen* is a promising and uniquely Japanese approach to capability building. Thus, it has a role to play in industrial policies directed at enhancing the performance of firms.

Beyond industrial policy, the research in this volume underlines the need for an active state. There is increasing recognition that market imperfections are widespread in low-income countries, and that many markets are incomplete and suffer from coordination failures. These are often reflected in barriers to learning. For that reason, government support is important when *Kaizen* is not widely known, where FDI is limited, and where local companies' participation in global value chains is not commonplace. An active government role may be particularly important when lack of trust between workers and employers regarding the distribution of benefits from any increase in productivity is strong.

Finally, workers are critical to the success of *Kaizen*. *Kaizen* makes them active participants in solving problems and pushes managers at all levels to listen to their suggestions for productivity and quality improvements. In that sense it contributes not only to better business performance; it is a social innovation that may help to reduce inequality through improvements of workers' living standards.

NOTES

1. For a large firm, this distinction is less relevant than for a small firm.
2. See Chap. 5 by Jin, and Chap. 9 by Ishigame.
3. See for example World Bank (2015).
4. Regarding innovation inputs and outputs, see Cirera and Maloney (2017).
5. See Chap. 3 by Hosono.
6. See Shimada, Chap. 4.
7. As it was in Japan in the inception phase of the productivity enhancing campaign (see Chap. 4 by Shimada).
8. McKinsey Global Institute (2019).
9. The productivity differentials are even more striking in developing countries. See Hsieh and Klenow (2009).

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