Introducing KAIZEN in Africa

Edited by

GRIPS Development Forum

October 2009

GRIPS

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Foreword

This book aims to introduce the basic concept and characteristics of *kaizen* to African audience and explain how Japan has implemented *kaizen* assistance in developing countries. It also discusses the factors that affect the performance of international *kaizen* assistance.

Kaizen means continuous improvement of productivity and quality, based on a participatory process involving the entire workforce. With no requirement for huge investment, it is a low-cost approach to productivity and quality improvement. Moreover, *kaizen* is applicable not only to the manufacturing sector but also to the service sector, public organizations, and non-profit organizations.

Kaizen is one of the standard menu items of Japanese industrial support in developing countries. It has been widely practiced in Asia by Japanese firms and their local subcontractors, and increasingly in Latin America and Eastern Europe as well. Nevertheless, knowledge-sharing and implementation of *kaizen* has so far been limited in Sub-Saharan Africa, partly due to the relatively small presence of Japanese business activities in the continent.

Since late 2008, the GRIPS Development Forum has been engaged in industrial policy dialogue with the Ethiopian Government, in collaboration with the Japan International Cooperation Agency (JICA). Compilation of this book was prompted by strong interest shown by Prime Minister Meles Zenawi in Japanese development experiences and his request for the Japanese Government to introduce *kaizen* in Ethiopian firms, modeled on JICA's *kaizen* assistance in Tunisia. We are grateful to all contributors who responded to our initiative in a fairly short period. We are also very grateful to the Embassy of Japan and JICA for providing valuable support and inputs to this endeavor.

We sincerely hope that this publication will motivate the interested readers to go deeper to find practical suggestions from other documents and, furthermore, stimulate the discussion on how Japan's *kaizen* assistance can complement the Western management approach, which is more widely practiced in Africa.

Tokyo, October 2009
GRIPS Development Forum

Chapter 1
Introduction

Izumi Ohno, Kenichi Ohno, and Sayoko Uesu

> *The Kaizen philosophy assumes that our way of life—be it our working life, our social life, or our home life—should focus on constant-improvement efforts….. In my opinion, Kaizen has contributed greatly to Japan's competitive success.* (Imai, 1997, p.1)

In Japanese management, *kaizen* means "continuous improvement" involving the entire workforce from the top management to middle managers and workers.[1] The origin of Japan's *kaizen* movement was the quality control method imported from the United States (US) in the post WW2 period. Japan assimilated and developed this as its own management practice method which later even surpassed performance in the US. This adapted method, which became known as *kaizen*, spread rapidly among Japanese companies including a large number of small and medium-sized enterprises. It subsequently spread overseas as Japanese business activities expanded abroad and Japanese companies began to build production networks with local companies.

Japan offers assistance for *kaizen* in many developing countries through private channels such as intra-company technology transfer and support for local suppliers, as well as through public channels such as official development assistance (ODA) and guidance provided by various public organizations. By now, *kaizen* assistance is one of the standard menu items of Japanese industrial support in developing countries. While such assistance initially focused on East Asia where Japan had active business partnerships, it has now been implemented widely in other regions including South Asia, Latin America and Eastern Europe. However, as far as Sub-Saharan Africa is concerned, knowledge sharing and implementation of *kaizen* has been rather limited except in a few notable cases (see footnote 5). There are a lot of unexploited benefits of selective and well calibrated application of *kaizen* from which African countries can draw upon to improve their production and service units.[2]

There is also a need for Japan to more actively propagate the idea of *kaizen* in Africa as an additional menu item in their industrial development strategies. This is partly because of increased interest among African countries in the growth agenda in general and in East Asia's industrial

[1] *Kaizen* literally means improvement: change (*kai*) for good (*zen*).

[2] While many documents stress the importance of "continuous improvement" in Africa, especially in relation to trade promotion strategy and activities like Technical Barriers to Trade (TBT) and Sanitary and Phytosanitary measures (SPS) (for example, see Foss (2004, pp.113-118)), their recommendations do not discuss the specific actions needed in detail.

experience in particular. In addition, this is important because of the plans announced by the Japanese government at the Fourth Tokyo International Conference for African Development (TICAD IV) at Yokohama in May 2008 to promote trade and investment in Africa.[3]

The purposes of this book are to: (i) introduce the basic concept and characteristics of *kaizen* to African audience; (ii) explain how Japan has implemented *kaizen* assistance in developing countries including the range of sectors and countries and the methodology adopted by Japanese experts to transfer necessary techniques and practices; and (iii) discuss factors that affect the performance of international *kaizen* assistance. The book also provides information on the history of Japan's quality and productivity improvement.

1. Principles and tools

The two key features of *kaizen* are *incremental and continuous improvement* and *involvement of the entire workforce* in that process. The workforce, even workers, need to participate in producing small but frequent changes by making suggestions for improvement in both process and product. Beyond that, the logical structure of the concept of *kaizen*, the precise relationship among its tools, and concrete measures and sequences adopted on the factory floor, are difficult to pin down since there are many different schools of teaching that emphasize different aspects and tools of *kaizen* relative to others. Even among excellent companies, Toyota's way is different from Honda's way, and the Panasonic philosophy is quite distinct from Canon's.

According to Masaaki Imai, who introduced *kaizen* to the international audience with his seminal book, *Kaizen: The Key to Japan's Competitive Success*, *kaizen* is an umbrella concept for a large number of Japanese business practices (Imai, 1986; 1997—see Figure 1-1). It could even be argued that, like Zen Buddhism, it is not just a management technique but a philosophy which instructs how a human should conduct his or her life. *Kaizen* focuses on the way people approach work. It shows how management and workers can change their mindset together to improve their productivity. As Edwards C. Johnson III, CEO of Fidelity Investment, puts it, while there are many strategies for management success, *kaizen* is different since it helps focus in a very basic way on how people conduct their work (Imai, 1997).

[3] As the main organizer of the TICAD IV, the Japanese government made a commitment to intensify its engagement in boosting economic growth in Africa. Major initiatives in this regard include: (i) expanding training programs in Africa to improve the productivity of promising industries (by the Japan International Cooperation Agency: JICA) and to facilitate trade and investment by transferring Japanese manufacturing and marketing skills (by the Association for Overseas Technical Scholarship: AOTS); (ii) establishing mechanisms for ODA to complement private sector activities that contribute to African development; (iii) setting up the Japan Bank for International Cooperation (JBIC) Facility for African Investment to offer equity investment, guarantees, and local currency financing; and (iv) regularly providing information on the African business climate to Japanese private companies (by Japan External Trade Organization: JETRO). See Yokohama Action Plan and its Appendix.
<http://www.mofa.go.jp/region/africa/ticad/ticad4/doc/actoin.pdf>
<http://www.mofa.go.jp/region/africa/ticad/ticad4/doc/appendix.pdf>

Figure 1-1. The *Kaizen* Umbrella

Source: Imai (1986, p.4).

There are a large number of related and often overlapping components that belong to the *kaizen* toolkit such as: 5S, Suggestion System, Quality Control Circles (QCC) or Quality Circle (QC), Total Quality Control (TQC), Total Quality Management (TQM), Toyota Production System (TPS), Just-In-Time (JIT) System, *Kamban* System, and so on. Among these, 5S is generally considered to be the most basic step for improving quality and productivity. Beyond that, the emphases vary according to the particular author or expert. A brief explanation of each is provided below.

Table 1-1. Selected Components of the *Kaizen* Toolkit

Term	Explanation
5S	5S is a philosophy and checklist for good housekeeping to achieve greater order, efficiency and discipline in the workplace. It is derived from the Japanese words *Seiri* (Sort), *Seiton* (Straighten), *Seiso* (Shine), *Seiketsu* (Systematize), and *Shitsuke* (Standardize/Self-Discipline). There are also different English renditions.
Suggestion System	A Suggestion System is the method by which the ideas and suggestions of employees are communicated upwards through the management hierarchy to achieve cost savings or improve product quality, workplace efficiency, customer service, or working conditions. Examples range from simply placing suggestion boxes in common areas, to implementing formal programs with committees reviewing ideas and rewards given for successful adoption of those ideas.
Quality Control Circle (QCC)	QCC is a small group of workers who collectively find a problem, discuss alternative remedies, and propose a solution. QCCs voluntarily perform improvement activities within the workplace, as part of a company-wide program of mutual education, quality control, self-development and productivity improvement.
Total Quality Management (TQM)	TQM represents a number of management practices, philosophies and methods to improve the way an organization does business, makes its products, and interacts with its employees and customers. QCC activities function as an integral part of TQM. Historically, statistical quality control was born in the US, and Japan imported and developed that concept as Total Quality Control (TQC) in the 1960-70s, which evolved as TQM in the late 80s.
Toyota Production System (TPS)	TPS is the philosophy which organizes manufacturing and logistics at Toyota, including interaction with suppliers and customers. It focuses on the elimination of waste and defects at all points of production including inputs, process and final output (delivery). The term "Lean Production System" can be used interchangeably.
Just-In-Time (JIT) System	JIT, a part of TPS, is a production system aimed at eliminating non-value-adding activities of all kinds and achieving a lean production system flexible enough to accommodate fluctuations in customer orders.
Kamban System	*Kamban* refers to a communication tool in the JIT production and inventory control system, developed at Toyota. A *kamban* (signboard) is attached to a given number of parts and products in the production line, instructing the delivery of a given quantity. When the parts have all been used, the *kamban* is returned to its origin where it becomes an order to produce more.

Source: Compiled by the author, based on Imai (1986, 1997), Fujimoto (1999), Fukui et al. (2003), Liker (2004), and Asian Productivity Organization (APO) website.

2. The history of diffusion

Kaizen activities have developed and spread in Japan and later to the rest of the world in four phases.

The first phase was the absorption of foreign technique by Japan in the early postwar period. In the 1950s, the world market perceived Made-in-Japan products to be as "low price, low quality."

Driven by a sense of urgency for industrial catch-up, Japan learned American style quality management from Drs. W. E. Deming and J. M. Juran, and adapted this to the Japanese context. A national movement for quality and productivity improvement emerged, supported by the Union of Japanese Scientists and Engineers (JUSE), established in 1946, and the Japan Productivity Center (JPC), established in 1955. Many companies developed their own systems of *kaizen*, including the globally known TPS developed by the Toyota Motor Corporation. These efforts laid a solid foundation for establishing the so-called Japanese production management system. Thus, *kaizen* was originally a foreign technique which was adopted and adjusted to become a Japanese technique (Chapters 2 to 4 will explain the history of Japanese quality and productivity improvement efforts).

The second phase was diffusion throughout Japanese companies, including small and medium-sized ones. This led to a rapid increase in the number of QCCs in the 1970s and 80s (see Chapter 3 for more details). The two oil crises in the 1970s drove Japanese companies to integrate energy saving into their quality and productivity improvement efforts.

The third phase was the regional spreading of *kaizen* beginning in the mid 1980s, which coincided with the globalization of Japanese business activities. The sharp appreciation of the Japanese yen after the Plaza Agreement[4] in 1985 prompted Japanese manufacturing companies to shift their production bases to East Asia where production costs were lower. Japanese firms tried to duplicate the quality management system in their factories abroad. Moreover, as they endeavored to increase local procurement of intermediate inputs, local suppliers were requested to conform to Japan's quality standards. Japanese companies often assisted their local partners to learn *kaizen* philosophy and practices. Also, various public organizations—the Association for Overseas Technical Scholarship (AOTS), established in 1959, the Asian Productivity Organization (APO), established in 1961 as a regional inter-governmental organization, the Japan Overseas Development Corporation (JODC), established in 1970, the Japan International Cooperation Agency (JICA), JUSE, and JPC—began their active engagement in *kaizen* assistance in developing countries. The first JICA project for productivity management was extended to Singapore from 1983 to 1990 (see Chapter 5). Building on the success of this cooperation, the Singapore Productivity and Standard Board has subsequently grown to become a major organization to extend training programs to other countries and regions, including the Southern African Development Community (SADC) under partnership arrangements with JICA. This Singaporean case is regarded as the best example of graduation from and international diffusion of Japan's *kaizen* assistance.[5]

[4] The governments of the US, Japan, France, Germany and the United Kingdom agreed to depreciate the US dollar against the yen and the mark. It was signed on September 22, 1985 at the Plaza Hotel in New York City. The exchange rate value of the dollar versus the yen declined by 51% from 1985 to 1987.

[5] The Singaporean government and Japanese government jointly implemented the third-country training program on productivity management in SADC countries during 1997-2002. In addition to the bilateral channel, *kaizen* assistance is also offered by Japanese experts utilizing Japanese funds through international organizations. For example, during the 1990s, the World Bank supported the government of Burkina Faso in implementing QCC through technical assistance. In 2003, the Inter-American Development Bank (IDB) produced a handbook for TQM and QCC for Latin America and the Caribbean Region.

The fourth phase, which is now beginning, has witnessed growing interest in East Asia's industrial experience in other developing regions (including Africa). However, outside, interest in and knowledge of the East Asian approach often remains general and insufficient, and has not been operationalized with practical details. This situation, together with the Japanese government's TICAD IV initiative for promoting trade and investment in Africa, provides an opportunity for Japan to more actively publicize and introduce *kaizen* in developing regions including Africa.

3. The Japanese approach vs. the Western approach

There are notable conceptual differences between the Japanese and the Western management approaches. In particular, *kaizen* contains many features unique to the Japanese industrial experience. First, the Japanese approach emphasizes small incremental changes under existing technology while the Western approach favors innovation based on technological breakthroughs (Clark et al., 2009; Imai, 1986 and 1997).[6] Second, the Japanese approach focuses on human elements and advocates people's process-oriented efforts for improvement, while the Western approach is more inclined towards reviewing performance from results-based criteria (Imai, 1997). *Kaizen* does not necessarily call for large investments, such as installing new machines or hiring experts. Instead, it requires continuous effort and commitment at all levels of the workforce to propose and practice the use of existing human and capital resources to improve quality and productivity. Imai (1986) gives a comparison of *kaizen* and *innovation* in Table 1-2.

Table 1-2. Features of *Kaizen* and Innovation

	Kaizen	Innovation
1. Effect	Long-term and long-lasting but undramatic	Short-term but dramatic
2. Pace	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 ìchampionsî
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).

[6] Clark et al. (2009) describes it as the difference between *kaikaku* (reform, big change) and *kaizen* (small incremental changes).

In a sense, the differences between the Japanese and the Western approach are a matter of degrees. Generally, few Japanese managers belittle the importance of having the right kind of equipment or conducting Research and Development (R&D), while Western managers cannot be accused of neglecting the workers in factory management. For example, Toyota makes enormous efforts for innovation and integrates such efforts with its *kaizen* activities (Clark et al., 2009). There are many areas of overlap and agreements between the two, and they may often produce similar prescriptions for improvement. Nevertheless, the comparison is still meaningful because they point to different initial actions, priorities and sequences which may result in different overall performance. For developing countries, having two distinct perspectives will broaden the strategy space for enterprise managers and policy makers.

One of the frequently recommended management tools of the Western origin is business process re-engineering (BPR). BPR differs sharply from *kaizen* as it aims at a fundamental and drastic change that leads to a breakthrough rather than achieving incremental improvements on a daily basis. BPR is "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical measures of performance" (Hammer, 1990; Hammer & Champy, 1993). In fact, according to Hammer (1990), re-engineering is an all-or-nothing proposition with an uncertain result, which cannot be accomplished through small and cautious steps. BPR usually takes a top-down approach in contrast to *kaizen*'s participatory bottom-up approach. In implementing BPR, the re-engineering team assumes central responsibility by representing the functional units being reengineered and having all other units depend upon it.

Another popular management tool from the West is benchmarking, whose basic procedure is gathering information on a number of competing firms or countries engaged in the same activities, comparing the performance of targeted domestic firms against the so-called best practice, and setting goals for improvement. *Kaizen* also differs from benchmarking, since the latter is a tool for "identifying, understanding, and adapting outstanding practices and processes from organizations anywhere in the world to help your organization improve its performance" (American Productivity & Quality Center[7]). Benchmarking is mainly for identifying one's weaknesses and setting goals in relation to others whereas *kaizen* is applied mainly to find room for improvement internally and realizing this through team effort.

For example, in the process of assisting the Ethiopian government in formulating a master plan for the Leather and Leather Product Industry (LLPI), the United Nations Industrial Development Organization (UNIDO) conducted a benchmarking exercise to compare the Ethiopian LLPI against four of the best LLPI performing countries, namely, India—specifically West Bengal (leather), Vietnam (leather and footwear), China (footwear) and Italy (footwear). This exercise analyzed the availability of raw materials, labor costs, the level of human capital, the establishment of backward

[7] <http://www.apqc.org/portal/apqc/ksn/GlossaryofBenchmarkingTerms.pdf?paf_gear_id=contentgearhome&paf_dm=full&pageselect=contentitem&docid=119519>

and forward linkages, design capacities, as well as strategies and policy mixes adopted by these four countries (e.g. price, product, and communication). In doing this, it intended to help generate an understanding of the relative strengths and weaknesses of the supply chains in the Ethiopian LLPI in the global context and design strategies to overcome such constraints and weaknesses (UNIDO, 2005). While this specific exercise was undertaken at the industry level, it is also possible to conduct benchmarking at the firm level.

4. Applicability to developing countries

The philosophy, concept, and tools of *kaizen* have been adopted not only in Japanese firms but also in many multinational corporations in the US and Europe. Many studies note that, in both Japan and abroad (especially in the cases of American and European companies), leadership is the single most important factor for successful implementation of *kaizen* (Imai, 1986; Kaplinsky, 1995; also see Chapter 4 of this book). This implies that it is possible to apply *kaizen* in countries with different socio-cultural contexts but that application must be conducted under proper leadership and with adjustments that reflect the uniqueness of the targeted society.

In introducing *kaizen* to Africa, three issues are raised here for the attention of the interested reader. They are: (i) complementarity with the Western approach which is more frequently adopted in Africa; (ii) cost effectiveness of adopting *kaizen* instead of other methods; and (iii) transferability of *kaizen* to the socio-economic environment of developing countries.

Complementarity with the Western approach

Japanese and Western approaches are different. Can they be adopted simultaneously in the same country, or even in the same firm, to produce a successful synergy? Or are they incompatible so only one model can be implemented? Are *kaizen* and BPR complementary or substitutes? We are not ready to give a simple answer to this difficult question here. It appears that a meaningful answer must come from proper contextualization of the problem at hand.

To improve different aspects of the same company, it should be possible to mobilize two alternative methods at the same time. For example, BPR can be invoked to make a discontinuous breakthrough such as introducing new overseas marketing or cutting-edge technology, whereas *kaizen* can be used to raise productivity and reduce waste on the factory floor. The former can be achieved by outsourcing experts at market cost, for example, while the latter is a daily process which does not conflict with the former.

However, from another angle, there is some concern. BPR is most compatible with top-down management styles while *kaizen* requires an organizational structure which permits bottom-up decision making. Yet, the two cannot be embodied in one organization—or can they? Our purpose here is to raise questions without suggesting finite answers. To go beyond this, further studies and drawing

concrete lessons from experience will definitely be needed.

Cost effectiveness

Generally speaking, *kaizen* is a low-cost approach to productivity improvement for two reasons. First, it does not require huge capital investment, expensive technology, or costly R&D since it seeks to use existing equipment and human resources in a more efficient—less wasteful—way. Second, the key goal of *kaizen* is to generate the internal capability of the targeted firm and to let it ultimately "graduate" from the guidance of external *kaizen* experts and conduct continuous improvement by itself. In fact, if *kaizen* instructors do not leave the company after one or two years, improvement efforts should be considered a failure. Thus, *kaizen* is particularly suited for enterprises in low-income countries which face financial access problems.

While a large sum of capital is not needed, however, other things must be invested in, in order to garner the benefits of *kaizen*. They include strong commitment by executives, long-term orientation, a sense of oneness, trust and teamwork among all levels of personnel, and willing cooperation of workers. Can that be ensured? This leads to the next issue below.

Transferability across cultures

In the developing world, a number of attempts to implement *kaizen* have yielded a wide range of results, for example, in Southeast Asia and India.

On the one hand, there are views that question the general applicability of *kaizen* to developing countries. They argue that most developing countries face the problem of weak human resources. Continuous improvement requires a seamless extension of training and skills development to the entire workforce. However, in a country with low literacy, it is difficult for firms to implement such a training system for the entire workforce (Kaplinsky, 1995). Short-terminism, the lack of upward mobility, and inattention to details of the workers in general may also add to management's problems. Furthermore, in societies where the hierarchical structure is deeply rooted, it may not be easy to introduce a participatory mechanism in which all workers are encouraged to contribute actively to process and product improvements. In addition, managers' misconceptions about continuous improvement are common sources of difficulty, since they often expect instant results, whereas in reality it takes time before the benefits of quality management become visible (Karsten & Pennink, 2007). In such circumstances, even if managers know the concept and tools, translating these ideas into practices and internalizing *kaizen* as a company-wide movement remains very complex tasks.

On the other hand, the diffusion of *kaizen* philosophy and practices are already observable in some parts of the developing world, especially in Southeast Asia and India. Japan's *kaizen* assistance programs in Singapore, Brazil, Central America, and Tunisia, which are mentioned in different chapters of this book (Chapters 3 to 5), also show that efforts are being made by local institutions

to adopt *kaizen*. This inevitably requires assimilation in the specific country context, and progress is reported in some cases. These cases should serve as useful references for Africa to help understand key factors that determine the success and failure of applying *kaizen* in the developing world.

It should also be added that, even in Japan, workers were lazy, short-sighted, and hardly productive in the early 20th century (Ministry of Agriculture and Commerce, 1901). Disobeying company rules and executive orders was the norm rather than the exception. Through the effort of private firms and public policies, these "ungovernable" workers were transformed into *kaizen* workers half a century later. Culture does not change easily, but it is also incorrect to say that culture is immutable.

5. A guide to the chapters

Following this introduction, the four chapters provide concrete ideas from Japan's implementation of *kaizen* assistance in developing countries, as well as information on Japan's postwar experiences in improving quality and productivity

Chapter 2 (by Ayako Ishiwata) reviews ongoing *kaizen* assistance in Africa, discusses the need for *kaizen* in Africa drawing on the cases of Kenya and Ethiopia, and raises key issues to be considered in applying *kaizen* activities to African manufacturers. Chapter 3 (by Akio Hosono) explains how quality and productivity improvements originating in the US were developed into the *kaizen* movement in Japan. He suggests possible application of *kaizen* in a variety of activities and in different country contexts, highlighting the cases of JICA's assistance in Brazil and Central America. Chapter 4 (by Tsuyoshi Kikuchi) explains how Japan implements *kaizen* assistance in developing countries, based on the case of a JICA project in Tunisia. It contains information on specific activities supported by the project, institutional arrangements, outputs, and so on, and draws lessons for successful implementation. Lastly, Chapter 5 (by Takafumi Ueda) provides an overview of JICA projects in *kaizen*, which range from *kaizen*-only projects, integrated projects, master plans aimed at model companies, regional projects, experts and training courses. Based on a variety of JICA's past and ongoing assistance in Asia, Latin America, and Europe, he suggests that *kaizen* can be applied in many parts of the world, including Africa.

This book is meant for those who have little information on or experience in *kaizen*. It provides a broad picture to help the interested reader explore particular aspects of the topic. For specific details about *kaizen* philosophy, tools, or company-specific experiences, there are a number of books, manuals and handbooks which are readily available. We do hope that the reader will not stop with this book but go on to find practical suggestions from other documents. To help readers get started, we attach a short list of selected references below.

Table 1-3. Selected Literature and Websites

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Chapter 2
Needs for *Kaizen* Activities by African Manufactures

Ayako Ishiwata

1. Global spread of *kaizen* activities

Kaizen is a familiar word for the Japanese. In its direct translation, *kaizen* simply means "improvement," without any concept of time frames. On the other hand, the term *kaizen* used in management means the creation of a system, which enables continuous and sustainable improvement for an organization. Since global competition calls for never ending improvement, the goal of *kaizen* activities is not static and always has to be shifted to a higher level.

Kaizen has two definitions. The broader definition of *kaizen* encompasses various production and quality management tools under the umbrella of *kaizen* philosophy. On the other hand, the narrower definition is improvement of the workplace ("*gemba"*) derived from proposals from the workers on the basis of a quality control circle (QCC) and a suggestion system. This paper adopts the broader definition of *kaizen*.[8]

The *kaizen* method has been established as an outcome of various activities undertaken for improving the productivity and quality of Japanese products after mid 1940s, as Japanese manufactures were urgently trying to catch up with the standards of American and European manufacturers. Initially, efforts were made to learn from western management systems, particularly the statistical quality control methods. Introduction of an annual award for quality management, the Deming Prize, has contributed to awareness among enterprises and provided opportunities to learn from best practices.[9] Through this process, the western management strategy was combined with Japanese management methodologies and gradually developed into the *kaizen* system.

The best *kaizen* model is considered to be the one developed in the Toyota Motor Corporation since 1950s, as Toyota initiated the QCC with the introduction of statistical methods. A QCC is formed by a group of workers in *gemba*, who discuss issues and actions to improve the quality and productivity of products, and to upgrade personal skills. A suggestion system is usually intro-

[8] For example, Imai (1986 and 1997) uses the broader definition, and Fujimoto (1997) uses the narrower definition.

[9] The Deming Prize is named after Dr. W. Edwards Deming who was invited to Japan by the Union of Japanese Scientists and Engineers (JUSE) in the 1950s. The Deming Prize was initially created using contribution from Dr. Deming's sales of copies of his lecture notes on quality management to Japanese manufacturers. In appreciation to Dr. Deming's contribution, JUSE has managed the funds and continued the Deming Prize Awards since 1950. (source: Homepage of JUSE <http://www.juse.or.jp/e/deming/01.html> accessed on 1 May 2009.)

duced together with the QCC in order to integrate both initiatives into the management systems of companies. Then Toyota developed a Just-In-Time system by eliminating all types of wastes in the production flow.[10] After these unique methodologies were being practiced widely in Japan, the philosophy and methodologies of *kaizen* have become famous worldwide through Imai's book on *kaizen* written in 1986.[11] His book received attention particularly because the success of the Japanese manufacturers was intriguing western countries by then, and the uniqueness of *kaizen* convinced the west that the *kaizen* methodology was a key element for success. From there, other notable books introducing the Toyota production system, as well as Imai's book, helped the west to understand and adopt the details of the *kaizen* method.[12]

The *kaizen* methodology is often contrasted to the western management style. Since *kaizen* attaches importance to the workplace where actual activities are carried out, the workers in *gemba* are the centre of *kaizen* activities. Although the owner and the managers are responsible for making decisions and providing guidance, the workers are the key people who make proposals for improvement and implementation. This bottom-up decision making process is considered in sharp contrast to the orthodox western management style, in which solutions and decisions are mostly made by managerial staff, and workers are simply ordered to implement them.

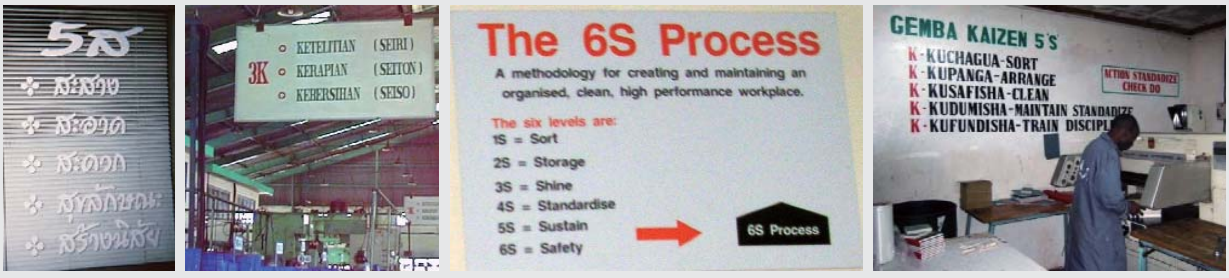
The advantages of empowering workers are three-fold. Firstly, the workers who are engaging in the actual production are in a better position to know the sources of the problems, and usually have clearer ideas for solutions than managerial staff. Secondly, involvement of the workers for *kaizen* activities raises their motivation towards achieving the targets for improvement. Thirdly, small steps taken by all sections and all workers are usually more efficient and effective than making big investments towards improvement. In fact, a key characteristic of *kaizen* is that improvements come with minimum investment, since the emphasis is on minimizing waste.

Under the philosophy of *kaizen*, various production and quality management tools are used. The most basic tool of *kaizen* is 5S, which stands for Sort (*Seiri*), Straighten (*Seiton*), Shine (*Seiso*), Systematize (*Seiketsu*), and Standardize (*Shitsuke*). Since the original terms of 5S are in Japanese, 5S are translated into various symbols and words by each company globally (see photos below). Contrary to the belief that the high technology of Japanese manufacturers heavily relies on modern machinery, such high product quality and productivity could not have been attained without the 5S principle. These simple house keeping methods are undertaken by all employees in successful Japanese manufacturers, regardless of their position in the company. This is in sharp contrast to traditional companies in developing countries where house keeping is usually undertaken by specific employees who are often considered of lower status.

[10] Ohno, Taiichi, the key person in developing the Toyota Production System between the 1950s and 70s, classifies 7 types of wastes (*muda*): i.e. overproduction, inventory, repair/rejects, motion, processing, waiting, and transport (as referred in Imai (1997, p.75)).
[11] Imai (1986).
[12] For example, Ohno (1988), and Monde (1983). The third edition of Monde's book is now available.

Global Implementation of 5S

5S are practiced in various counties as 5S sign boards in *gemba* symbolize implementation.



From left to right: a local company in Thailand; a Japanese company in Indonesia; a multinational company in Kenya; and, a local company in Kenya.

Source: Sanyu Consultants Inc. and KRI International Corporation (2008, p.94).

Kaizen does not prescribe for a particular model since as it empowers creation of the system to the workers in *gemba*. On top of 5S, each company selects and combines various production and quality control tools such as a QCC, a Just–In-Time System, Total Productive Maintenance (TPM), Total Quality Control (TQC), Total Quality Management (TQM), etc. Some tools originate from the western management system. However, these tools are combined through bottom-up decision making processes involving all employees and bringing about step-by-step improvements with emphasis on eliminating all types of waste in production.

While Toyota's *kaizen* model contributed to systematically developing the *kaizen* concept and method, the *kaizen* approach (i.e. bottom-up decision making process, house keeping activities involving all the workers, and step-by-step improvement with eliminating wastes) is culturally common in the Japanese managerial system. Therefore, Japanese manufacturers did not have to take drastic efforts to establish *kaizen*. Moreover, leading Japanese assemblers consider that implementation of 5S is a minimum requirement for becoming their suppliers. Since 5S implementation is visually observable at *gemba*, all their suppliers are urged to implement 5S. These are the reasons why *kaizen* is the de facto standard in most of the successful manufacturers in Japan and became the core of the success of the Japanese industry.

2. *Kaizen* assistance in Africa

Kaizen has become a global activity spread by multinational companies and their employees. It has become popular not only in the manufacturing sector but also in the service sector. However, proliferation of *kaizen* in Africa is still very small due to the limited number of players who bring in the practice. Since individual companies cannot be a major force in transferring *kaizen*, the activities of the following four organizations are considered vital in transferring the *kaizen* method to Africa.

Kaizen Institute

The Kaizen Institute is an international private consultant group that specializes in the *kaizen* method. It has licensed networks throughout 24 countries from which consultants provide services globally. In Africa, its subsidiary is in Mauritius.[13] Their performance has proved that the *kaizen* method is much needed and commercially viable. There are also other unlicensed consultancy firms, which can provide training on *kaizen*. Yet, these private services are still the domain of medium and large-scale companies, and their services are not affordable for most micro and small enterprises in Africa.

JICA

The Japan International Cooperation Agency (JICA) is the executing agency for official development assistance from the Government of Japan. JICA's activities cover a variety of subjects, and *kaizen* is one of the activities often undertaken by JICA under the subject of private sector development. A characteristic of JICA's assistance is that the content of each project is customized according to the needs and conditions of the recipient country. *Kaizen* activities are often found project titles such as "productivity improvement." In Africa, Tunisia and Egypt are on-going beneficiaries from the *kaizen* projects assisted by JICA.

JICA's *kaizen* assistance in Tunisia	JICA's *kaizen* assistance in Egypt
< Study on the Master Plan for Quality/Productivity Improvement in the Republic of Tunisia >	< Quality and Productivity Improvement Centre (*Kaizen* Centre) Project >
Period: August 2006 to July 2008[14] Sectors: Electrics/Electronics and Food Processing	Period: October 2007 to April 2011
Activities : ● Fact finding survey of the manufacturing industry ● 11-month pilot project on *kaizen* activities for 30 selected companies from the electrics /electronics and food sectors[15] ● Formulation of the master plan for the national dissemination of *kaizen* activities	Activities : ● Capacity building of the Centre ● Seminars, training, and consultation ● Creation of the best practices with model companies ● Establishment of publicity tools (newspaper, homepage, etc.)
Kaizen Tools : QCC, 5S, layout improvement, worker-hour work balance, setup time minimization (single minute exchange of die), etc.	*Kaizen* Tools : QCC, 5S, Total Quality Management, etc.
Source: Japan Development Service Ltd. (2008).[16]	Source: Knowledge Site in the JICA homepage <http://gwweb.jica.go.jp/km/ProjectView.nsf/NaviProPj?OpenNavigator> accessed on 1 May 2009 (Japanese texts only).

[13] Homepage, Kaizen Institute <http://www.kaizen.com/contact/> accessed on 1 May 2009.
[14] Second phase of assistance is now being planned.
[15] 64% (9 companies) of the electrics/electronics sector and 31% (4 companies) of the food sector made viable quality and/or productivity improvements by the end of the pilot project.
[16] See also, Kikuchi (2009) "JICA-Supported Project for Quality and Productivity Improvement in Tunisia" Chapter 4 of this book.

Asia Productivity Organization

Productivity improvement is a common agenda globally. The Asian Productive Organization (APO), established in Tokyo in 1961, has been the focal point for promoting productivity improvement in Asia. APO now has 20 member countries, and each country has established a center responsible for productivity improvement. In 2006, APO decided to extend its activities towards member countries of the Pan African Productivity Association (PAPA) through the Japan Productivity Center (JPC), a member of APO in Japan. PAPA was established in South Africa in 2002 and now has 8 member countries. The main purpose of this assistance is to provide organizational capacity building to the productivity centers in the member countries. In the first phase of the program, which ended in March 2009, JPC provided seminars and consultations on *kaizen* to 14 model companies in South Africa, Kenya, Botswana, and Mauritius. In many countries, productivity centers are established under the ministries dealing with labor issues. In these countries, the targeted beneficiaries of the *kaizen* assistance through the productivity centers are not restricted to the manufacturing sector, as is the case in Kenya and Mauritius.

Sustaining Competitive and Responsible Enterprises Program by ILO

The International Labour Organization (ILO) has a program entitled Sustaining Competitive and Responsible Enterprises (SCORE), formerly called the Factory Improvement Programme (FIP). SCORE aims to improve productivity and quality among small and medium enterprises by building good workplace practices. Although SCORE does not use the term *kaizen*, its methodology has many similarities with *kaizen* including 5S and QCC. SCORE has five modules: i) workplace cooperation; ii) quality management; iii) productivity and cleaner production; iv) organizing motivated and productive workers; and, v) safety and health. Its activity includes in-class training and on the job training in the model companies. In addition to the manufacturing sector, SCORE aims at expanding its benefits to the service sector. SCORE, then operating as FIP, has so far been implemented in Sri Lanka, Viet Nam, India, and China, and is in the process of expanding its program to other countries including in Africa. In Ethiopia, SCORE training is to be introduced to the Cotton and Textile Project, in which six export-oriented garment factories have been selected as model companies.

3. Needs for *kaizen*: cases for Kenya and Ethiopia

To give more specific ideas on the needs for *kaizen* in Africa, the cases of Kenya and Ethiopia are discussed as follows.

Kenya

The manufacturing sector in Sub-Saharan Africa is generally not dominant compared to the agriculture and service sectors. Kenya is no exception. In 2007, the contribution to GDP of the manufacturing sector in Kenya was 11.8%, whereas the agriculture and the service sectors accounted

for 22.7% and 58.2%, respectively.[17] Manufacturing activities in Kenya vary widely, since the country was a popular investment destination in the 1970s and 80s within East Africa.

There are some leading multinational companies operating in Kenya which are bringing in *kaizen* methods including Toyota East Africa Ltd.[18] and GlaxoSmithKline Kenya Ltd.. Furthermore, the Kenya Association of Manufacturers (KAM), which has approximately 600 members, has been actively involved in organizing seminars and training to upgrade the capacity of its members. KAM has partnered with the Kaizen Institute in Mauritius since 2005 and has been inviting experts for seminars and consultations.[19] These costs are now partly covered by the African Management Services Company whose original sponsor is the International Finance Corporation (IFC). KAM and the Kaizen Institute set up an annual award on *kaizen* in 2008.[20] Since the demand for training on *kaizen* is growing, the Kaizen Institute is offering regular training courses of its own in Nairobi. Because of publicity gained through newspaper articles presented by KAM, *kaizen* is relatively well recognized in Kenya, and now there are some local private consultants who can provide *kaizen* services.

As for public initiatives, the Productivity Centre of Kenya (PCK), which has been receiving assistance from APO and JPC since 2006, has organized seminars and provided consultations to 3 model manufactures, in addition to 4 governmental and service institutions. PCK, currently under the Ministry of Labour, has only 5 personnel. Its activities have received good attention from the Government, and there is a plan to legally expand both the mandate and capacities of PCK during the 2009/10 Fiscal Year.

In spite of the presence of some *kaizen* activities in Kenya, there are some challenges. Firstly, the beneficiaries of KAM's *kaizen* activities are so far limited to relatively well-established enterprises, and the majority of manufactures are still not aware of the actual methodology. Secondly, the mandate of PCK does not focus on the manufacturing sector. Therefore, the spread of *kaizen* activities to manufacturers through the channel of PCK may be slow. Yet, the Ministry of Industrialization as well as its agencies, which are the key public institutions for the manufacturing sector, are yet to be conversant with the *kaizen* methodology and cannot guide local manufacturers.

Ethiopia

The contribution of the manufacturing sector to GDP is even smaller in Ethiopia. In 2006/07 it

[17] Source: *Kenya at a glance*, the World Bank <http://devdata.worldbank.org/AAG/ken_aag.pdf> accessed on 1 May 2009.

[18] However, activities of Toyota East Africa are currently limited to trade and after sales service.

[19] Mabati Rolling Mills Ltd., Bidco Oil Refineries Ltd., Synresins Ltd., and Tetra Pak Ltd. are the main players promoting *kaizen* activities among KAM members.

[20] KAM reports that *kaizen* interventions have often resulted in 50-70% reductions in throughput time, 50-100% increases in productivity, 20-40% savings in manufacturing costs, 40-60% reductions in quality errors, and 50% releases of space, as well as significant improvements in team spirit and morale. (Source: KAM Homepage: *Industries Compete for Kaizen Awards*, Newsletter of 23 July 2008. <http://www.kam.co.ke/?itemId=17&newsId=98> accessed on 1 May 2009.)

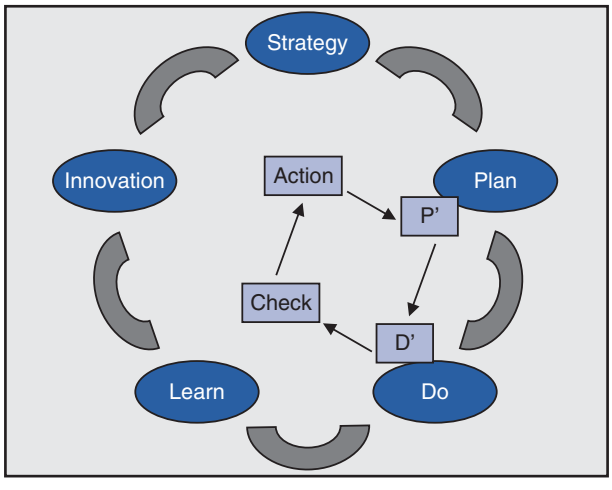
was just 5.1%, in comparison to 46.3% from the agricultural sector and 40.3% from the service sector.[21] Compared to Kenya, the presence of multinational companies is very small in Ethiopia. At the same time however, some talented local entrepreneurs have enjoyed the benefits of access to a market consisting of nearly 80 million people. Due to the absence of major multinational companies, Ethiopia is yet to absorb the knowledge of *kaizen*.

One characteristic of the Ethiopian manufacturing industry is the dominance of public enterprises. 44% of value addition from the manufacturing sector was produced by 154 public enterprises in 2006/7.[22] The Government of Ethiopia is committed to modernization and productivity improvement in its public enterprises. The Privatization and Public Enterprise Supervising Agency (PPESA), a section under the Ministry of Trade and Industry, is responsible for implementing Business Process Reengineering (BPR) among public manufacturers.

BPR introduces benchmarking practices and intends to review the needs for restructuring organizational missions and activities. Although *kaizen* has not been adopted as a productivity improvement method by PPESA, it is considered that BPR and *kaizen* are complementary since BPR is a tool needed for innovation or radical transformation, while *kaizen* is needed for bringing in gradual and sustainable improvement to daily operations.

The outer circle of Figure 2-1 shows the process of BPR. It involves "learning" from the best practices and strategic decisions ("strategy") by top managers. On the other hand, the inner square illustrates the process of *kaizen.* Once strategic decisions are made by top managers, the major role of Plan-Do-Check-Act (PDCA) is given to the workers in *gemba*, and managers are to monitor and supervise the PDCA cycle. Therefore, introduction of *kaizen* shall reinforce initiatives undertaken by BPR.

Figure 2-1. Complementary Relationship between BPR and *Kaizen*



Source: Takanashi (2006, p.71).

[21] Source: *Ethiopia at a glance*, The World Bank <http://devdata.worldbank.org/AAG/eth_aag.pdf> accessed on 1 May 2009.

[22] Source: Central Statistical Agency, *Statistical Abstract 2007*, Ethiopia.

The private sector in Ethiopia is also aware of the need for productivity and quality improvements, and the leading manufactures have adopted TQM. Yet, they have not established a visual monitoring system, which enables real-time production and quality control. Furthermore, adoption of 5S is hardly observable. Introduction of *kaizen* shall strengthen TQM already initiated in those manufacturers.

4. Application of *kaizen* activities to African manufacturers

African manufacturers are not only disadvantaged by the technological gap but also by the lack of knowledge in key managerial methodologies like *kaizen*. While engineering capacity may take time to catch up, managerial capacity may be improved more quickly since *kaizen* tools are developed in a way to be appreciated by all the workers, and its fundamental methodology is not very complicated. *Kaizen* is more to do with a philosophy and daily practices rather than techniques. For example, 5S can be taught even to the primary school students since the philosophy is Sort, Straighten, Shine, Systematize, and Standardize. The beauty of *kaizen* is that it can realize productivity improvements with little additional investments. Simplicity and cost effectiveness are the major reasons why *kaizen* is well appreciated globally.

However, there are a few challenges in implementing *kaizen* in Africa. Firstly, in countries which have a socialistic nature like Ethiopia, power may be very much concentrated in the hands of top managers, whereas the basic concept of *kaizen* is empowering the workers in *gemba*. It may be a challenge for managers to change their attitude and trust the workers in *gemba*. Secondly, workers without sufficient educational backgrounds may not understand tables and figures. Since visualization of production and quality performance is one of the key tools of the *kaizen* method, separate training for workers may be required to develop a full understanding of the tools. Thirdly, the sources of productivity loss are often found outside the company, particularly delays in the delivery of materials and sudden interruption of orders from retailers and traders due to oversupply in the markets. Therefore, the problems of *gemba* may often be found outside the company. Improving the business network, both backward and forward, should be an important element of productivity improvement for most African manufacturers. These solutions may require some logistical arrangement such as use of information and communication technology (ICT) and improved transport.

Furthermore, in order to nationally disseminate *kaizen* activities in African countries, two measures should be considered. Firstly, *kaizen* needs to be publicized as a national movement. As mentioned earlier, *kaizen* is effective not only for the manufacturing sector but also for the service sector. Disseminating the best practices through the media should raise awareness amongst people of the need for *kaizen* activities. Secondly, the dissemination route through vocational institutions shall be vital. Vocational institutions provide for a wider array of beneficiaries among workers in the manufacturing sector than in other types of institutions in Africa. Since the number of manufacturers which have the chance to attend seminars or become model companies for *kaizen* activities will inevitably be small, it is recommended that training at vocational institutions be promoted.[23]

Kaizen is knowledge which is very applicable for African manufacturers but has yet to be transferred well enough. Japanese consultants often hear about the need for capital and machinery from African manufacturers. However, capital and machinery need to be accumulated and invested in from their own internal resources. What is to be supported is not hardware, but knowledge that helps to generate and accumulate internal resources. As experienced by the leading Japanese manufacturers, managerial tools, particularly the *kaizen* method, are critical for productivity and quality improvements across industries.

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Union of Japanese Scientists and Engineers (JUSE) <http://www.juse.or.jp/e/>

[23] However, only a few vocational training centers globally implement the good practices of *kaizen*. One best practice location is the State Owned Tool Room & Training Centre in Bangalore, India, which incorporates *kaizen* in its training. (Source: Sanyu Consultants Inc. and KRI International Corporation (2008, p.140))

Chapter 3
Kaizen: Quality, Productivity and Beyond

Akio Hosono

The purpose of this chapter is to summarize relevant aspects of *kaizen* and quality and productivity improvement efforts in Japan, as well as draw conclusions from cooperation to support similar efforts in Brazil and Central American countries.[24]

It is divided into two parts. Part one will explain how the quality and productivity improvements originating in the United States (US) were adapted into *kaizen* movements in Japan through the efforts of Japanese experts, engineers and managers in companies. Part two will show three examples of Japan's international cooperation in Brazil and Central America, and provide suggestions for possibly extending *kaizen* in a variety of activities and to different country contexts.

1. Development of quality, productivity and *kaizen* movements in Japan

Most Japanese manufacturing companies implemented quality and productivity initiatives for the first time after Dr. William Edwards Deming, a US statistician and consultant, gave a series of lectures on the statistical process control of production and quality for hundreds of Japanese engineers and managers in 1950.[25] Only a few Japanese companies such as Toyota were aware of the importance of the US derived statistical control of quality before. Dr. Deming came to Japan in 1947 upon the request of US Armed Forces to assist in the planning of Japan's National Census to be carried out in 1951.[26]

Accordingly, Japanese companies first introduced the statistical quality control (SQC) approach, which was developed from the US practice of sampling and inspecting products in order to eliminate defective ones. Efforts were made to reduce the rate of defective products, or to improve yield rates (known in Japan as "budomari").[27] The quality control (QC) processes to attain these goals also improved productivity at the same time. The cost of a defective product consists not

[24] This paper is based partly on the author's experiences in some Japanese cooperation projects in the areas of *kaizen,* quality and productivity improvement, but does not necessarily reflect the opinions of the institutions which implemented such projects. The author would like to express a deep gratitude to Professor Izumi Ohno, National Graduate Institute for Policy Studies (GRIPS), for her valuable comments and suggestions.

[25] Regarding Dr. Deming's contribution to the Japanese quality improvement movement as well as the Deming Prize, see Kikuchi "JICA-Supported Project for Quality and Productivity Improvement in Tunisia," Chapter 4 of this book for more details.

[26] Deming's work and his original recommendations on quality were ignored in his homeland before Japanese business imported his ideas and made them work in Japan (Fukui et al., 2003, p.v). In 1954, Dr. Joseph M. Juran came to Japan to talk on quality and productivity.

[27] Theoretically, "yield rate (budomari)" = 1 – "rate of defective products."

only of its normal production cost (labor, machinery, materials, etc.), but also the cost of its elimination and/or destruction. In cases where a defective product has to be reused to produce a non-defective product, the total cost could be even more. Therefore, it became clear that quality, in terms of the rate of defective products, is very important for productivity.[28]

Later, the productivity movement spread rapidly in Japan. As mentioned by Kikuchi (2009), this was inspired by similar movements in Europe and the US.[29] The close relationship between quality and productivity was widely recognized in Japan and these two words were often referred to together.

On the one hand, in order to clearly define the concept of quality, it is necessary to establish industrial norms or standards. This is because a product is considered defective only when it does not satisfy the quality norm or standard. In Japan, Japan Industrial Standard (JIS) and Japan Agricultural Standard (JAS) were introduced by law in 1949 and 1950 respectively.[30] JIS defines QC as a part of quality management. On the other hand, at the world-wide level, ISO 9000 established by the International Organization for Standardization (ISO), is well known as the international standard relating to quality management systems.[31]

When Dr. Deming introduced the concept of QC to Japan, he also presented, as a methodology to improve quality, the PDCA Cycle which consists of Plan, Do, Check and Act.[32] It is also called the Deming Wheel (Cycle) or Shewhart Cycle, as it was proposed by Dr. Deming, Dr. Walter A. Shewhart and others.

The Japanese way of QC was gradually consolidated when it was applied at the factory floor level. Instead of the "top-down" approach common in the US and other countries, a "bottom-up" approach was adopted in Japan. A team commonly known as the "Quality Control Circle" ("QC Circle" or QCC) was either organized spontaneously or followed the guidance of QC specialists in many Japanese companies.[33] Several workers (normally more than 3 and up to 10) from the factory floor participated in each QCC. They identified causes of defective products and possibilities for improving products or production methods.

[28] The Six Sigma approach developed by Motorola in the 1980s is a kind of statistical QC related to the probability of six standard deviations (i.e. six sigma) from the normal distribution, that is, 3.4 one-millionths (3.4 ppm).

[29] See Kikuchi (2009) for more details regarding the productivity movement in Japan and the establishment of the Japan Productivity Center (JPC) in 1955.

[30] The Japanese Engineering Standard (JES) was established in 1921.

[31] ISO 9000:2005 establishes the basic aspects and terminology of quality management systems and ISO 9001:2000 establishes the requirements of quality management systems.

[32] In Six Sigma, PDCA is developed to MAIC: Measurement, Analysis, Improvement and Control. DMAIC: Define, Measure, Analysis, Improve and Control, is the Toshiba version.

[33] Initially, there was no specialist or lecturer on this subject in Japan, so management and the engineers requested JUSE spearhead a national radio-based campaign on QC for concerned parties, especially factory foremen. The engineers started introducing the concept in the workshop and tackled the quality problems with frontline operators, teaching them simple statistical methods that resulted in fewer defective products. The frontline operators were amazed with the results and from then on voluntarily tackled the problems in the workshop with their colleagues. This voluntary activity was the start of QCCs. The first QCC was organized in 1962 (cited from Fukui et al., 2003, p.2).

Whereas, in the US and other countries, companies' QC departments were almost exclusively in charge of QC activities through testing or monitoring company products, in Japanese companies, all factory workers and related employees were dedicated to controlling and improving quality and productivity through the quality and productivity movement, together with the creation of QCCs.[34] The number of QCCs registered at the Union of Japan Scientists and Engineers (JUSE) increased from 50,000 in the mid-1970s, to 420,000 in 2001. The number of participants of QCCs increased from 500,000 to 3,200,000 during the same period.[35] (Figure 3-1)

In this process, Japanese scholars and engineers such as Dr. Kaoru Ishikawa, Ex-Rector of the Musashi Institute of Technology (recently renamed Tokyo City University), considered the "founder of quality control in Japan" as well as the "father of QC Circle," made very important theoretical and practical contributions.[36] Dr. Ishikawa is also known as the inventor of the Ishikawa Diagram, a cause and effect analysis diagram. There are a large number of well known engineers and managers who promoted quality activities in many Japanese companies. One of the most prominent is Mr. Taiichi Ohno, Ex-Vice President of Toyota Motor Company. He is one of those who consolidated the Toyota Production System (TPS).[37] Another prominent Japanese engineer who contributed much to quality activities is Dr. Shigeo Shingo, a consultant for Toyota and Panasonic, among others. Utah State University created "The Shingo Prize."

Together with QCC, many Japanese methods of quality and productivity improvement have been developed and have been continuously improved. One of the most widely implemented in Japan is known as the "5S," which consists of *Seiri*, *Seiton*, *Seiso*, *Seiketsu* and *Shitsuke*; these terms stand for Structurize, Systemize, Sanitize, Standardize, and Self-discipline (While these five slogans can be variously translated, they roughly refer to removing unnecessary things, arranging tools and parts for easy view, keeping the work place clean, maintaining personal hygiene and disciplined behaviour). Several methods, including 5S are commonly practiced by teams like QCC teams. PDCA, originally introduced by Dr. Deming and adapted to Japanese environment, has also been practiced by QCCs.

Kaizen has been one of the most important features of the Japanese QC approach, together with QCC. *Kaizen* is a Japanese concept which can be translated, literally, as "continuous improvement." It is not easy to define *kaizen in a strict sense* since it corresponds to evolving initiatives and activities in the quality and productivity area and can very flexibly be adapted to each factory floors' context.

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[34] A QCC is defined by JUSE as follows: "A small group of frontline operators who continually control and improve the quality of their work, products and services; they operate autonomously and utilize QC concepts, tools and techniques."

[35] Fukui et al. (2003, p.59).

[36] Dr. Ishikawa is the son of Ichiro Ishikawa, the first President of the Nippon Keidanren, the Federation of Economic Organization of Japan, and brother of Rokuro Ishikawa, former President of the Japan Chamber of Commerce and Industry. They were very influential in Japanese business community in the postwar period.

[37] Ohno (1988).

Despite flexibility in its application, *kaizen* has, among others, common characteristics. It is: (a) not imposed by "top-down" orders or instructions, but is a "bottom-up process" implemented at the initiative of each worker, based on their observations, experiences, knowledge, wisdom and so on; (b) not a one-shot activity, but is continuous and incremental; (c) not strictly limited to production itself, but covers all aspects of production including improvements in safety and morale, as well as improvement in quality, in operation efficiency and in delivery.[38]

The Japanese way of QC was gradually scaled up from the factory floor level to the whole company. QC was introduced to cover design, marketing, after-service, purchasing of materials and machinery, as well as other company departments. At the same time, all company employees, including managers, engineers, supervisors, office-workers, as well as factory workers participated in QC. This "bottom-up" holistic approach developed in Japan is called the Japanese type Company-Wide Quality Control (CWQC) or Total Quality Control (TQC). (Figure 3-2 and 3-3)

On the other hand, Total Quality Management (TQM) is a kind of management system and strategy based on CWQC or TQC,[39] and widely promoted in the 80s.[40] The Handbook for TQM and QCC edited by the Development Bank of Japan (DBJ) and the Japan Economic Research Institute (JERI) and published by the Inter-American Development Bank (IDB) explains that: "Total Quality Management[41] includes a number of management practices, philosophies and methods to improve the way an organization does business, makes its products, and interacts with its employees and customers. *Kaizen* (the Japanese word for continuous improvement) is one of those philosophies."[42] According to this handbook, "The success of Japanese business in Canada, Latin America, and the United States as well as in Europe is attributable to TQM, a concept now widely practiced throughout Asia."[43]

Japanese TQM started as TQC back in the 1960s, when Japanese industry was in the midst of the high growth economy, after the liberalization of its markets. One of the significant impacts of Japanese TQC is often explained by describing the development of the car industry during the oil crises in the 1970s. During this period, TQC was extended to activities for energy conservation and measures for resource maintenance. It greatly impacted various industries and became more

[38] *Kaizen* is cited as a holistic concept to support the Toyota Production System (TPS) (Liker, 2004, p.79). Fukui et al. (2003) considers *kaizen* to be one of the philosophies of Total Quality Management (TQM), as cited later in this chapter.

[39] Ishikawa also made a significant contribution to the development of CWQC or TQC as well as TQM. See Fukui et al. (2003, p.vii).

[40] By the end of the 1980s, the TQM concept had become a recognized part of quality-related language. See Fukui et al. (2003, p.vii). TQM was widely practiced in the 1980s in both Japan and the US. However TQM in the US was more top down compared with the Japanese bottom-up model. Regarding the different development of TQM in Japan and the US. See Fukui et al. (2003, pp.43-50).

[41] According to Fukui et al. (2003), TQM is defined as: "a set of systematic activities carried out by the entire organization to effectively and efficiently achieve company objectives so as to provide products and services with a level of quality that satisfies customers, at the appropriate time and price."

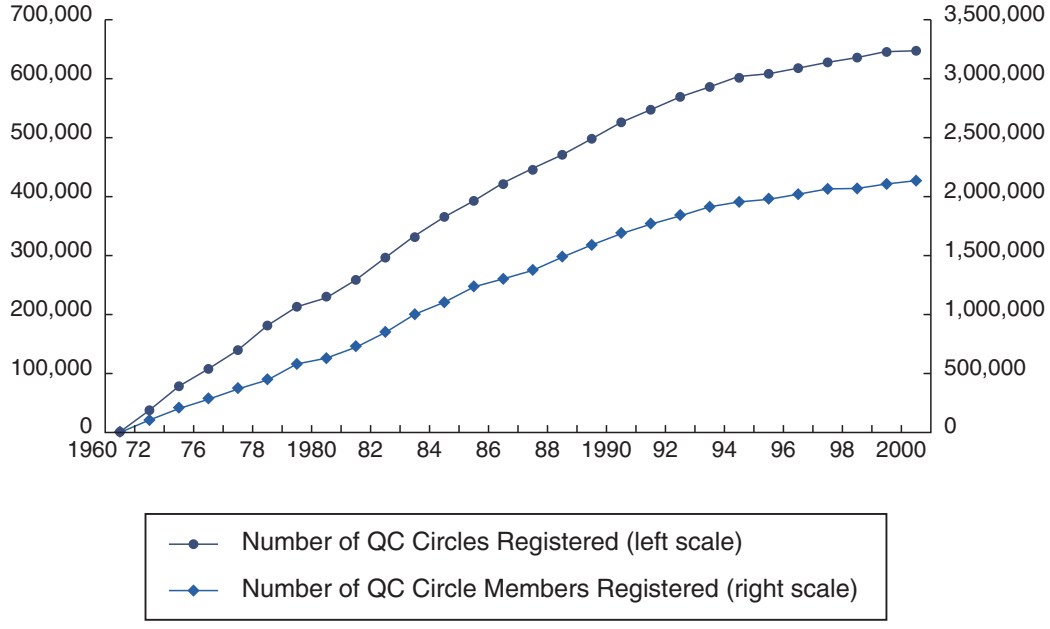
[42] Fukui et al. (2003, p.vii).

[43] Ibid. The handbook adds: "To be fair, we cannot say that the quality management was the sole factor for vigorous expansion of production and export; however, it was one of the major factors as many observers concur."

securely established as a valuable quality framework for Japanese industrial development.[44]

The Toyota Production System (commonly called TPS) can be considered one of the most systematic and advanced Japanese TQCs or TQMs, including *kaizen*,[45] and was the basis of many books on "Lean Production" in the US.[46] These books were the result of the Massachusetts Institute of Technology (MIT) research project entitled "Automobile Industry Program," and were published around 1990.[47] Authors of these books mentioned clearly that their study is based on the TPS.[48]

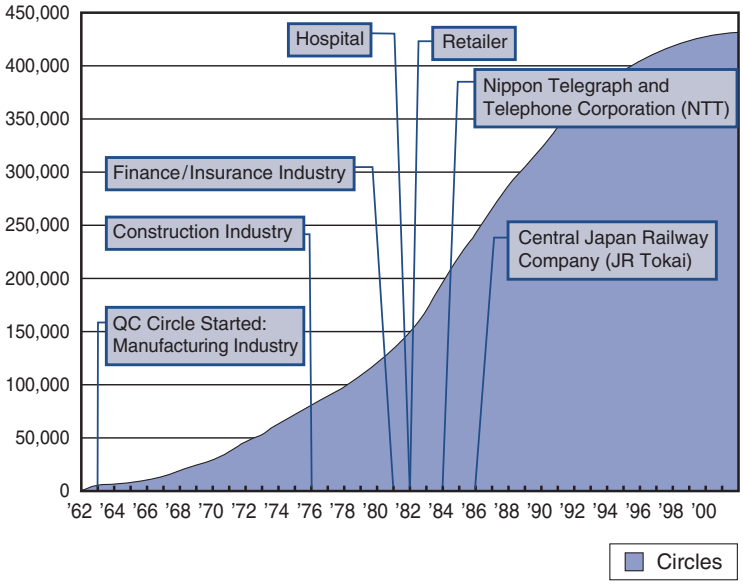
Figure 3-1. Number of QC Circles and Members Registered at JUSE (Japan)



Source: Union of Japanese Scientists and Engineers (2001).
Notes: Data as of October 2001.

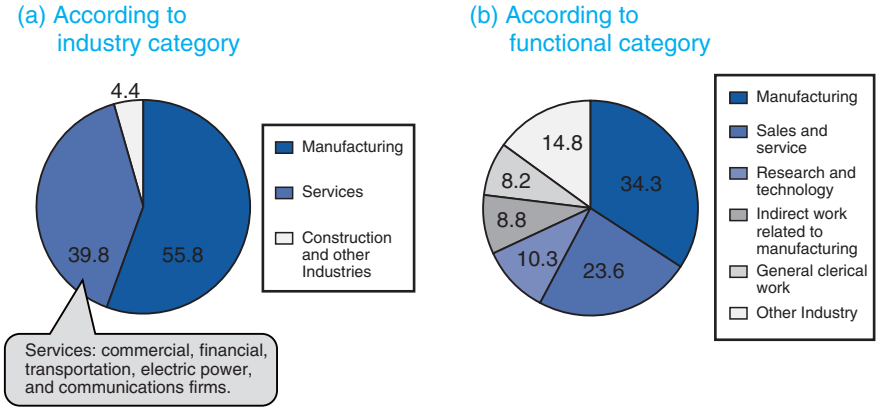
[44] This paragraph is cited from Fukui et al. (2003, p.46).
[45] In 1995, TQC at Toyota became TQM and as of 2001, Toyota had approximately 4,800 QCCs, all of them continuously aiming to improve the quality of their work and playing an important part in the company's success, according to Fukui et al. (2003, pp.8-9).
[46] Liker (2004, pp.45-46).
[47] Womack, Jones, and Roos (1991).
[48] Liker (2004, pp.64-65).

Figure 3-2. Trend of QC Circle Registration, by Industry in Japan



Source: Fukui et al. (2003, p.70), based on Union of Japanese Scientis and Engineers (2002).

Figure 3-3. Number of QC Circles Registered at QC Circle Headquarters (Japan)



Source: Saito (1995).
Notes: n: 13,020; Unit=%; 1990, 1992 and 1994 average.

2. Case studies on Japan's cooperation in Brazil and Central America

Kaizen, TQC and TQM, developed and widely practiced in Japan, are very effective approaches for quality and productivity improvement. In addition, they achieve wider management goals including motivation of employees, customer satisfaction, and so on. They are a well known part of Japanese management. However, it should be emphasized that *kaizen* as well as Japanese types of TQC and TQM can be introduced to countries where the culture is very different from that of Japan. Fukui et al. (2003) strongly endorses this view: "Are TQM and QCC Japanese things? Are they effective only in some cultures in the world? Our answer is a firm, "No!" They are not and should not be perceived to have such a narrow scope. Our firm belief is that they are applicable

anywhere because they invoke universal values."[49]

To illustrate, this paper looks at three Japan International Cooperation Agency (JICA) projects in countries with very different cultures from that of Japan, one in Brazil, and two in Central America, where *kaizen* and TQC were introduced. In the first case, JICA's Brazilian counterpart established its own concept of quality and productivity, adjusted to promote a new movement for productivity improvement in Brazil and meet the current requirements of the country. This concept is a comprehensive way of thinking which is not only for manufacturing but also related to company management, employment and socioeconomic development.

It was recognized that the situation of management in Central America is different from that of Japan. However, there have been various positive impacts on productivity for companies that received consulting services of the second project. These include, among others: positive changes in attitude among workers; introduction of 5S into companies, including participation of management and not just workers; simplification and standardization of production processes; improvements in team work; and, better awareness of international competition.

The third case is a project to apply *kaizen* to health care, a non-manufacturing sector, in Central America. An Evidence Based Participatory Quality Improvement (EPQI) system has been introduced in order to continuously improve health care quality in hospitals. Participants in this project implemented several pioneering EPQI projects in their respective countries and attained a considerable improvement in quality in health care. A regional network of EPQI was organized and regional conferences are now held every year with participants attending from the eight countries of Meso America.

Japan's cooperation with Brazil

JICA implemented the "Technical Cooperation for Brazilian Institute of Quality and Productivity Project" from 1995 to 2000.[50]

In 1990, the Brazilian Government started the Brazilian Program for Quality and Productivity (PBQP, the Portuguese abbreviation) with the intention to upgrade quality and productivity, in addition to promoting reforms and deregulation such as import liberalization, introduction of foreign investment and privatization of government-owned enterprises. From the mid-1980s, Brazil carried out substantial economic reforms in order to transform its inward-looking economy into an outward-looking one accompanied by sound macroeconomic management. In this context, and to adapt to this new economic policy, improvement of quality and productivity was considered extremely important for Brazilian enterprises.

[49] Fukui et al. (2003, p.x).
[50] The author of this chapter was the Chairman of the Advisory Committee for the project.

Furthermore, the Brazilian Government launched a plan to establish institutions to be in charge of improvement of quality and productivity in several states in the country, such as the Brazilian Institute of Quality and Productivity (IBQP).

With this background, the Brazilian Government requested the Japanese Government to commence the "Technical Cooperation for IBQP Project" in 1994. The overall goal of the project (originally established in 1995 and revised in 1998) was to attain that: "The concept and technology of productivity improvement will be disseminated among Brazilian society through IBQP-PR (abbreviation of IBQP of Paraná State)."[51] The purpose of the project was to ensure that: "The IBQP-PR will be able to upgrade and develop the technology and knowledge for productivity improvement."[52]

As mentioned, the IBQP-PR attempted to establish its own concept of quality and productivity, adjusted to promote a new movement for productivity improvement in Brazil and meet the current requirements of the country. Importantly, the basic document of IBQP-PR emphasized that: "In a manner similar to Japan's, Brazil must develop its own principle for productivity, examining and addressing the needs and desires of all segments of society. Conceiving these concepts and achieving nationwide understanding are hard task. However they are vital to congruence of interests centered round a competitive Brazil."[53]

This concept developed was a "comprehensive way of thinking which is not only for manufacturing but also related to company management, employment and socioeconomic development."[54] At the same time, the concept included consideration of environmentally sustainable development. The "Model of Systemic Productivity" developed is explained as follows: "The constant improvement of Productivity in each organization must help to create the conditions of sustainable development and better quality of life. Thus the productivity has, above all, a social function and the concept of systemic productivity is based on this function."[55]

This concept reflected both the business environment and the eco-consciousness of Brazil, and especially of the state of Parana. For example, Curitiba, Parana's capital, where this technical cooperation project was implemented, is well known world-wide for its eco-friendly urban system, especially its transport system.

Since the above-mentioned "productivity concept" proposed by IBQP-PR is a comprehensive one, "it has attracted many attentions outside such as Brazilian Service for the Support of Micro and Small Enterprises (SEBRAE), and Ministry of Development for Industry and Trade (MDIC) for public projects which are in accordance with the national policy, such as reinforcement of com-

[51] JICA (2000, p.7).
[52] JICA (2000, p.7).
[53] Cited from "Organizational Identity of IBQP-PR."
[54] JICA (2000, p.15).
[55] JICA (2000, p.136).

petitiveness of enterprises and export promotion."[56]

During the period of this project (1995-2000), 12 long-term experts and 19 short-term experts were dispatched from Japan. On the Brazilian side, 17 trainees were invited to Japan for capacity development. During the project period, 82 seminars and 26 training courses on quality and productivity were organized with the participation of IBQP-PR.

Factory floor level consultation activities were carried out by Japanese and Brazilian experts for more than 20 enterprises. IBQP-PR had associate members for which it provided updated knowledge and information on productivity, promoted effective exchange of experiences on productivity among members, and provided access to successful cases of productivity improvement through specialists. The associate members had access to services, consulting and advice from IBQP-PR throughout. Furthermore, IBQP-PR organized "The Latin America Productivity Seminar," inviting representatives of productivity organizations in Central and South American countries. The joint declaration of these organizations proposed the creation of the "Latin American Productivity Network."

Due to the above activities, "IBQP became widely recognized as a leading productivity organization in Brazil."[57] For example, IBQP has recently created, jointly with the Ministry of Science and Technology (MCT), the Studies and Projects Financing Entity (Finep) and the Federation of Industries of the State of Paraná (Fiep/PR), the Brazilian School of Systemic Productivity (EBPS). The primary objectives of EBPS are to disseminate knowledge, technology and innovation and to support the economic and social development of the country, generating more employment, income and quality of life for the society, through the invigoration of national companies. In line with IBQP's Education and Training guidelines, the EBPS proposal is to give Brazilian companies better competitive conditions at the global market, through the amplification of the Systemic Productivity Model.[58]

Japan's cooperation with Central American countries

Japanese ex-Foreign Minister Tadashi Kuranari, in his speech in the Republic of Guatemala in 1987 after the Agreement of Esquiplas II[59] was adopted by Central American countries, expressed that Japan is ready to extend as much assistance as possible for reconstruction of the region once peace is attained there.

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[56] JICA (2000, p.8).
[57] JICA (2000, p.8).
[58] This information is cited from the homepage of IBQP. According to the homepage, Systemic Productivity Model is explained as follows: Developed by IBQP, the concept of Systemic Productivity is an integrated approach of the technological, strategic, cultural, social and environmental factors involved in the productive process, through the analysis of indicators. These values seek to promote productivity in sustainable environments and increase employment levels in the country, aiming for the improvement of production, the fair distribution of productivity earnings and the cooperation between management and workers.
[59] By this agreement, Central American countries accepted the proposal of President Oscar Arias of Costa Rica regarding negotiation on the end of the war in the region.

A year later, as one of the concrete steps to follow up the *Kuranari* speech, the "Seminar on *Hito-zukuri* (human resource development) in Central America" was organized by JICA in Tokyo.[60] On the basis of that seminar, a technical cooperation project started in 1992 in the Republic of Costa Rica.

At that time, the Costa Rica Government's policy was to "focus on accelerating promotion of science and technology for improving efficiency and production of industries, skills of labor forces and increasing employment opportunities in order to achieve economic sustainability, enforcement of economic infrastructure, industrial development and improvement of living standard. Especially productivity improvement is recognized as a principal subject that contributes industrial development of Costa Rica considerably through human resources development and modernization of Costa Rican enterprises."[61]

It was in this context that "the Technical Instructor and Personnel Training Center for Industrial Development of Central America (referred to as CEFOF, the Spanish abbreviation) in the Republic of Costa Rica" was implemented by JICA from 1992 to 1997. Prior to this technical cooperation, the buildings of CEFOF at the campus provided by the Costa Rican Government, were constructed as part of Japanese cooperation efforts.

Afterwards, as "needs on productivity improvement had been diversifying due to globalization of economic activities," it was considered "necessary for CEFOF to improve its technical capacity on business management, and to expand contents of services of CEFOF as a major institution for disseminating technologies and information on productivity improvement."[62] The "Project of Productivity Improvement for Enterprises in the Republic of Costa Rica" started in 2001 for a period of 5 years, with the overall goal that the productivity improvement activities through CEFOF would be strengthened in Costa Rica and the Central American region.

The specific purpose of this project was to promote the concepts and practices of Japanese quality and productivity improvement approaches in Costa Rica and other Central American countries. The project also aimed at transferring these technologies from Japanese experts to Costa Rican counterparts through "on the job activities," which has resulted in the accreditation of management consultant for the CEFOF counterparts.[63]

It should be mentioned that just after the termination of the previous technical cooperation project by JICA, INTEL, a well-known micro-processor manufacturer invested in the country and started its operation from 1998.[64] The so-called INTEL effect took place and several companies related

[60] The author of this chapter was the coordinator of this seminar.
[61] JICA (2005, p.3).
[62] JICA (2005, p.3).
[63] CEFOF (2006, p.7).
[64] INTEL invested 700 million dollars in Costa Rica creating jobs for 3,500 workers and professionals. The company's exports are equivalent to 20% of the total value of Costa Rica's exports.

to INTEL located themselves in the country. Other foreign companies with no direct relationship also followed INTEL's lead.

Regarding the effect of the second project, the project's joint evaluation reported that: "various kinds of activities for productivity improvement have been conducted by the project in the region (Central America) according to the request of regional countries. Through these activities, the project established and tightened network between CEFOF and the other public institutions / private sector in these countries. The number of benefited companies through CEFOF's activities was increased in the countries of the region and CEFOF is receiving recognition and reputation widely from companies and respective institutes in the region. It is confirmed that there are lots of needs and much expectation on CEFOF's activities. In order to strengthen this regional activity in future, initiative of the Costa Rican Government will be expected such as training courses to certify Central American counterparts in 5S and *kaizen* activities by CEFOF consultants."[65]

Regarding the impacts of the consulting services implemented by the project, the above-cited Joint Evaluation mentions that: "Consulting services have been used as a tool for capacity development of counterparts in the form of 'on the job training.' Results of consulting service conducted by Japanese experts and counterparts are well appreciated."[66]

More concretely the Evaluation states that: "there are various kind of positive impacts on productivity improvement for the companies that have received consulting services of the project, such as: Correct and common understanding of key words at working place; Positive change of attitude among workers (way of thinking, awareness of security and *kaizen*); Introduction of 5S into companies, which made positive contribution, because the program requires participation of everyone, not only workers but also management, that secures sustainability of the 5S program; Improvement of motivation of employees; Simplification and standardization of production process, improvement of team work, better awareness of international competition in global business; Introduction of ISO9001-2000 which improved efficiency of company operation and provided more focus on customers' satisfaction."[67]

For this project, 9 long-term experts and 24 short-term experts were dispatched by JICA from Japan during the period of 2001-2005. 23 counterparts were invited to participate in training courses in Japan. JICA provided machinery and equipment for the project.

Costa Rican Counterparts, together with Japanese experts made efforts to adapt Japanese concepts and practices to the Central American context. The Quality Management Group of CEFOF understood that "the features of Japanese approach are '*Kaizen* activities' by 'working in team (small group activities)' and involvement of people, focusing on 'workplaces' and analysis and evaluation

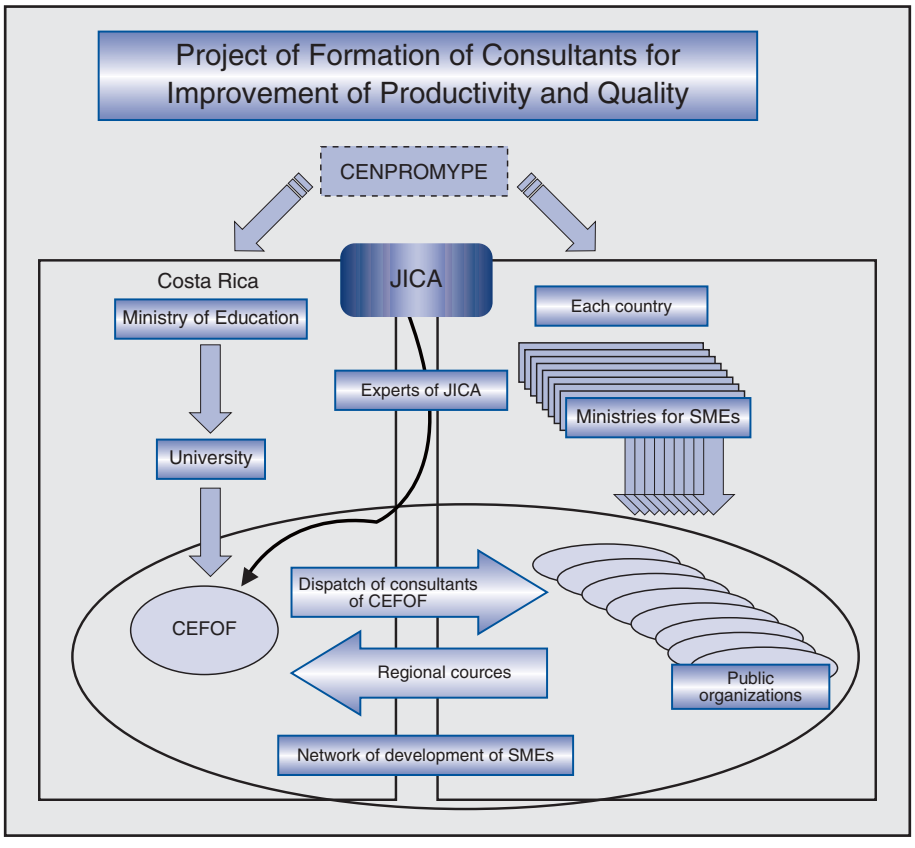
[65] JICA (2005, pp.7-8).
[66] JICA (2005, p.11).
[67] JICA (2005, p.11).

by the facts due to quantitative data."[68]

According to the report written by this group of CEFOF, "the situation of management activities at organizations in Central America is different from that of Japan."[69] In particular, "involvement of people" and "working in teams or small group activity" are the special features. Implementing these ideas in Central America means changing the corporate culture and reforming management.

Based on successful cases of companies in Costa Rica and El Salvador, the Quality Management Group of CEFOF concludes that the key to successfully implementing the Japanese approach is: firstly, to recognize and understand the Japanese approach to management regarding its effectiveness and efficiency; secondly, to practically apply this based on the faith of the managers in the Japanese approach; and, lastly ensure the enthusiasm of the employees for the activities.

Figure 3-4. Cooperation for the Technical Instructor and Personnel Training Center for Industrial Development of Central America (CEFOF)



Source: JICA, Latin America and the Caribbean Department (Presented at Japan Central America Business Workshop, Oct. 30, 2008, at JICA Research Institute).

[68] CEFOF, Quality Management Group (2005, p.3).
[69] This paragraph summarizes a part of the report of CEFOF, Quality Management Group (2005, p.9).

Japan's cooperation with Central American countries: Evidence Based Participatory Quality Improvement (EPQI) system in health care

The Evidence Based Participatory Quality Improvement (EPQI) System is a management system that can continuously improve health care quality in hospitals. EPQI was introduced in the Philippines and Central American countries by a group of Japanese professors led by Dr. Nauro Uehara, M.D. of Tohoku University's School of Medicine.[70]

EPQI helps improve health care in hospitals by: (1) organizing and training Quality Assurance (QA); (2) establishing health system indicators for quality health assurance that are aligned with the standards in the PHIC (Philippines Health Insurance Corporation) QA Benchbook; (3) establishing a QA Program and QA innovations in hospitals; and, (4) achieving better health outcomes and satisfied health care.

EPQI represents the concept and methodology that have been adopted from the work values contemplated in *kaizen*, such as 5S. EPQI national teams have voluntarily implemented projects designed to improve the quality of health care and services, focusing on the needs of patients and improving related projects. For example, strongly motivated to improve health services in Honduras, former participants of EPQI training programs organized by JICA have dedicated their time to promote projects related to patient safety under the EPQI methodology in three hospitals in Tegucigalpa.[71]

The EPQI Mesoamerica Network was established by former participants of the EPQI training programs from eight countries: Mexico, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, and the Dominican Republic. The members of the network are expected to promote quality in a hospital. Their work consists of assisting project volunteers and creating a group responsible for developing activities in a designated work station.

In 2006 and 2007, the Central America Regional Conference on EPQI was held in Costa Rica and Panama respectively. The activities of the Mesoamerican Network were crucial for the preparation of these conferences. At the 2006 conference, the EPQI program was scaled up to be region-wide cooperation project with support of the Panamerican Health Organization (PAHO, the Interamerican chapter of the World Health Organization (WHO)), as well as from ministers responsible for health in Central American countries. At that conference, 32 EPQI projects were presented and discussed with the participation of Mesoamerican countries and Dominican Republic. As these countries face similar situations regarding health care, for example the same diseases are trans-

[70] This section is based on information provided by the School of Medicine of the Tohoku University, Japan.

[71] For example, ex-participants, after their return to Honduras, executed an EPQI Project designed to reduce the waiting time for medical attention in the pediatric unit of San Felipe General Hospital. "Before implementing the project, the waiting period was six to eight hours; after the project, waiting was reduced to two hours." Through rigorous coordination, EPQI Net members in Honduras have, since 2006, executed projects designed to control infection, solid waste, hospital decorum and cleanliness, among others.

mitted across borders, regionalization of the EPQI program is considered very timely and effective for attaining the common goal of improving health care in the region. It has since been decided that the regional EPQI conferences are to be held every year.

3. Conclusion

Based on the experiences of *kaizen* and quality and productivity improvement efforts in Japan, as well as cooperation to support similar efforts in Brazil and Central American countries, the following implications can be applied in possibly extending *kaizen* in a variety of activities and to different country contexts.

First, *kaizen* as well as other quality and productivity improvement approaches (such as TQM), were born and developed in Japan. However, they are applicable elsewhere because "they invoke universal values," as demonstrated by the experiences, namely those of Brazil and Central America, explained in this chapter.[72] *Kaizen*, TQM and other approaches are evolving processes that never stop. These can be adapted to contexts with different cultures and business environments.

Furthermore, *kaizen* and other Japanese-made practices relating to quality and productivity are not limited to profit-making business activities or the manufacturing sector. The second implication from experiences shown in this chapter is that they are applicable to public organizations, non-profit organizations and to non-manufacturing sectors such as transport, health care and other service sectors, among others. An interesting case of "evidence-based quality improvement" applied to health care in Central America was explained in this paper for example.

The third implication from this research is that, in applying *kaizen* and other Japanese-made approaches, effort to adapt to the local context is essential. Strong engagement of both workers and managers, and experts and counterparts in case of cooperation projects, is the key for success. In a similar manner to Japan's, each country, society and enterprise must develop its own principle for quality and productivity. This can be done by examining and addressing the needs and desires of all enterprises and segments of society, as the report on Japan's cooperation with Brazil emphasizes. Conceiving these concepts and achieving nationwide understanding are not easy tasks. However, we can learn a lot about the adaptation and internalization of *kaizen* and related approach to local context from different experiences in many countries.

[72] Fukui et al. (2003, p.vii).

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Chapter 4
JICA- Supported Project for Quality and Productivity Improvement in Tunisia

Tsuyoshi Kikuchi[73]

This chapter aims to explain how Japan has been transferring its factory-level quality and productivity improvement (or *kaizen)* techniques to developing countries, by presenting a concrete case of "The Master Plan Study for Quality and Productivity Improvement in the Republic of Tunisia" supported by the Japan International Cooperation Agency (JICA). This work is built upon the author's experiences in serving as project leader of this technical cooperation, which lasted from August 2006 until July 2008.

The chapter is organized in three sections as follows. First, it provides detailed accounts of the JICA project including the activities supported by the project, institutional arrangements such the counterpart agencies responsible for the project and outputs produced by the project. It then analyzes factors for realizing successful results and draws lessons from the project. Third, it describes Japan's postwar experiences in improving quality and productivity, including how the quality and productivity improvement movement started and became institutionalized in Japan, how Japan learned from the American and European management systems, and what kinds of policies and measures were adopted for the promotion of industrial technology.

1. Project introduction: Master plan study for quality/productivity improvement in the Republic of Tunisia

1-1. Projects objectives and background

Objective

The objective of the project was to formulate a comprehensive master plan and action plan that includes institution building for quality and productivity improvement in Tunisia's industries.

Background and course of the project

Following the conclusion of a partnership agreement between Tunisia and the European Union (EU) in 1995, Tunisia and the EU agreed to abolish tariff barriers by 2008. With this in mind, Tunisia has been striving to bolster the international competitiveness of its domestic industries since 1995. The EU has also provided support regarding the acquisition of international standard certifications including the International Standard Organization (ISO) 9000 series, Hazard Analysis

[73] This chapter is based on the author's presentation at the seminar entitled "Methodology for Formulating Industrial Action Plans—Experiences of East Asia and JICA Technical Cooperation," co-hosted by the Ethiopian Development Research Institute (EDRI) and JICA on December 15, 2008, in Addis Ababa.

Critical Control Point (HACCP) and others geared to improving the quality of Tunisian enterprises and thereby enhancing their competitiveness. As you may be aware, ISO9001 places requirements on the establishment of procedures (decision of work methods), documentation (compilation of work methods into documents) and recording (retention of records of work results) for quality management. However, simply acquiring ISO9001 does not necessarily mean that quality will automatically improve or that productivity will be enhanced. Realizing this, the Tunisian Ministry of Industry, Energy and Small and Medium Enterprises (Ministère de l'Industrie, de l'Energie et des PME: MIEPME) requested cooperation in this field from Japan, which has gained worldwide attention for its successful industrial growth based on development of unique methods and techniques of quality control and production management.[74]

Counterpart agencies

The counterpart agencies to JICA were MIEPME and the National Quality Programme Unit (UGPQ), while the counterparts of the JICA consultant team were the technical staff of the public Technical Centers under MIEPME. More specifically, MIEPME has public Technical Centers in each industrial sector. In the project, ten technical staff members participated as counterparts from both the electric and electronic and machinery sector (Centre Technique des Industries Mechaniques et Electriques: CETIME) and the food processing sector (Centre Technique de l'Agro-Alimentaire: CTAA) respectively.

1-2. Study activities

This project was implemented over two years, starting in August 2006 and ending in July of 2008. During this time, the JICA consultant team visited Tunisia five times and stayed for two or three months on each occasion. The study, including activities in Tunisia and Japan, was divided into three phases. An outline of each phase is introduced below. Moreover, a bird's eye view of the project in table form is shown on page 53.

[Phase 1: August - December 2006]

In Phase 1, 83 Tunisian companies were visited in order to conduct a fact-finding survey of the quality and productivity improvement efforts of companies. The Tunisian Government requested that the pilot project (PP) target two sectors: 1) electrical and electronic; 2) and food processing, and therefore the survey focused on these two sectors. The fact-finding survey targeted 33 companies in the electrical and electronic sector, 30 companies in the food processing sector and 20 companies in other sectors. Based on the survey findings, a total of 29 PP target companies, 15 in the electrical and electronic sector and 14 in the food processing sector, were selected. Table 4-1 shows the products that are made by these companies.

[74] Differences between the EU and JICA approaches to quality/productivity improvement in Tunisia are described in the following paper: Kikuchi (2008) "The Quality and Productivity Improvement Project in Tunisia: A Comparison of Japanese and EU Approaches," *Diversity and Complementarity in Development Aid-East Asian Lessons for African Growth*, edited and published by GRIPS Development Forum.

Table 4-1. Pilot Project Target Companies and Major Products

Sector	Major Products of PP Target Companies
Electrical and electronic sector (15 companies)	Domestic electrical appliances (2), wire harnesses and cables (2), current stabilizers (ballasts) (3), solar water heaters (1), connectors (1), batteries (1), plug outlets (1), switches (1), circuit breakers (1), fluorescent lamps (1), others (1)
Food processing sector (14 companies)	Vegetable processing (4), olive oil (2), confectionery (2), beverages (1), dates (1), meat (1), fish processing (1), wine (1), food additives (1)

Note: At the start of the PP, there were 15 target companies in the electrical and electronic sector and 14 in the food processing sector, however, these numbers dropped to 14 and 13 respectively by the end of the PP.

[Phase 2: January - October 2007]

Phase 2 was primarily the implementation phase for the PP.

There are numerous technologies and techniques for quality/productivity improvement (hereinafter, technologies and techniques for quality/productivity improvement shall be referred to as "*kaizen*[75] techniques"). The objective of the PP was to confirm which *kaizen* techniques are effective for which kinds of problems, and how far Japanese thinking and approaches can apply to countries with differing social and cultural customs. In addition, the PP aimed to utilize these findings in formulating a master plan for the future improvement of quality/productivity in Tunisian industries covering all sectors.

In implementing the PP, a joint team comprising JICA consultants, counterparts and target companies was organized. Table 4-2 shows the composition of the teams organized in the target sectors.

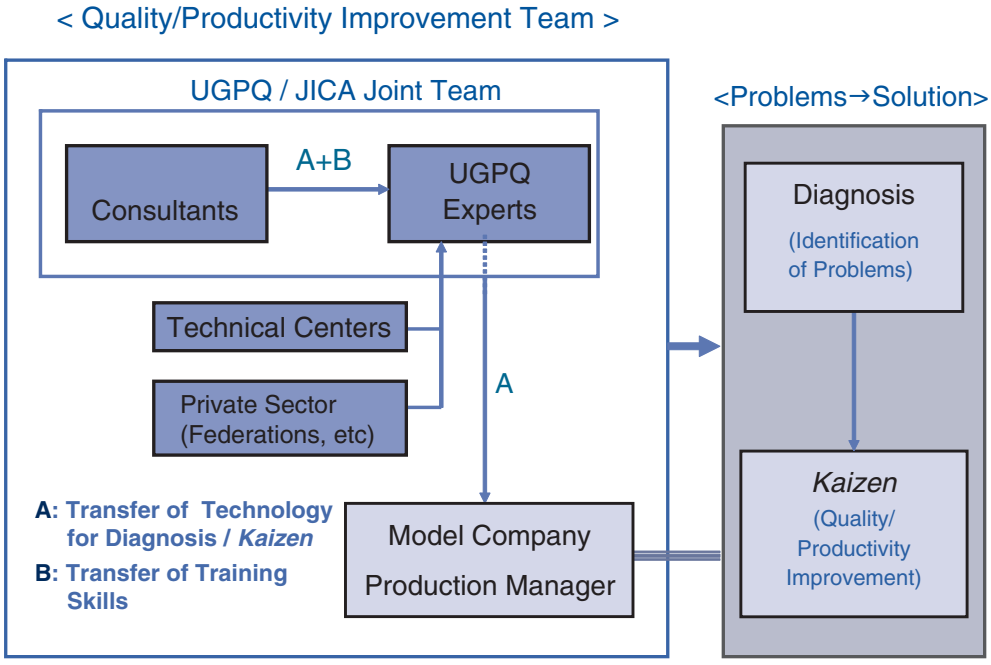
Table 4-2. Pilot Project Implementation Team

		Organized PP implementation teams		Number of team members from JICA, counterpart, PP target companies
		Electrical & electronic sector team	Food processing sector team	
JICA consultant team	Team leader Member in charge of institution building Member in charge of work coordination	Electrical and electronic consultants: 2	Food processing consultants: 2	7
Counterpart team	UGPQ director Member in charge of institution building Member in charge of work coordination	Electrical and electronic technical staff: 5	Food processing technical staff: 5	13
PP target companies team	Top managers	Production managers / Quality controllers Employees in charge of production	Production managers / Quality controllers Employees in charge of production	Numbers varied depending on the company

[75] The Japanese word "*kaizen*" has come to be internationally used in the area of production management. In English, this is referred to as continuous improvement.

In Phase 2, upon dividing the target companies into the electrical and electronic sector and the food processing sector, a corporate diagnosis of each company was undertaken, two or three problems in terms of quality/productivity improvement were identified in each company, and the JICA consultants, counterparts and target companies (top managers, production managers or quality controllers) examined what kinds of *kaizen* techniques should be applied for resolving each issue. Based on this, a PP implementation plan was prepared for each PP company. Each plan was implemented based on the premise of using existing machinery and equipment, i.e. exploring how far quality/productivity improvement could be achieved without introducing new machinery and equipment. Figure 4-1 shows the overall view of the PP.

Figure 4-1. Concept of Pilot Project for Quality/Productivity Improvement



Source: Elaborated by the author.

During the PP, the JICA consultants and counterparts visited each company seven times on average. Each time meetings were held to verify that homework given in the previous meeting had been done, to check progress of improvement activities, to exchange opinions, and to determine what should be done by each PP company by the next visit. Rather than directly instructing solutions to top management and line managers (i.e. production managers and quality controllers) of the PP companies, effort was made to give hints and methods of thinking for solutions. The PP company personnel were encouraged to discover problems for themselves and to strive for solutions on their own, because it was deemed that this would give the companies a better chance at sustainable development.[76]

[76] On this point, a manager of one of the PP target companies said, "The project didn't give us fish but rather how to catch the fish," and this was the intent of the JICA consultant team.

Outputs of the pilot project

Around nine months were spent implementing the PP. The following four items represent the main outputs of the PP and can be the basis of successful implementation of similar projects.

1) Improvements were seen in quality and productivity in more than half of the PP target companies;
2) The quality and productivity awareness of PP company managers was reformed;
3) Basic technologies, including Japanese *kaizen* techniques for quality/productivity improvement were transferred to the counterparts; and,
4) Guidance manuals concerning quality/productivity improvement were prepared.

Outline descriptions of these outputs are given below.

1) Improvements were seen in quality and productivity in more than half of the PP target companies

The PP was implemented over nine months from January to October 2007. More than half of the target companies experienced greater improvements than expected in the areas of quality/productivity.

During the PP period, the number of companies that were able to achieve numerically expressible quality/productivity improvement using existing machinery and equipment was 9 out of 14 companies (64%) in the electrical and electronic sector and 4 out of 13 (31%) in the food processing sector. For example, 8 companies achieved at least 20% higher productivity, 3 of which raised productivity by at least 50%; another company cut its nonconformity rate from around 20% to 0%, while another company reduced die replacement times from 110 minutes to 70 minutes. Other companies were unable to produce numerically expressible results during the PP period. However, they have the potential to produce outputs in the near future. Furthermore, even if they do not, they will at least be able to utilize the *kaizen* techniques acquired during the PP in their future corporate production activities (see Table 4-3).

2) The quality and productivity awareness of PP company managers was reformed

At the start of the PP, the techniques used for improving quality and productivity were so basic that most of the top managers and line managers doubted whether such techniques could produce good outputs. However, as the PP advanced and outputs started appearing, their awareness regarding quality/productivity improvement changed and more managers approached the work vigorously. In the final analysis, the best results were achieved in the companies where the managers were the most enthusiastic about quality/productivity improvement. This outcome is indicated in Tables 4-4 and 4-5.

Table 4-3. Results of Quality/Productivity Improvement in the PP
(figures indicate the number of PP companies)

	A	B	C
Electrical and electronic sector	9	3	2
Food processing sector	4	3	6

Source: Compiled from the *Master Plan Study for Quality/Productivity Improvement in the Republic of Tunisia* (Final Report, July 2008), available from JICA homepage (http://www.jica.go.jp/).

Note: Rank A indicates companies that achieved conspicuous outputs in terms of higher awareness of quality/productivity improvement among top managers and line managers, higher per capita productivity, shortened operation and travel times in the factories, reduced defects and so on. Rank C indicates companies where awareness of quality/productivity improvement among top managers and line managers was rather passive and conservative and where no particular progress was made in terms of quality/productivity improvement (although at least the *kaizen* techniques were transferred). Rank B indicates companies situated somewhere between these two extremes. Among the B-ranked companies, some realized increased productivity of 50% or more during the PP period, although the awareness of top managers regarding the importance of quality/productivity improvement remained rather weak. Such assessments were made by the JICA consultants and UGPQ/Technical Center staff, i.e. the counterparts.

Table 4-4. Electrical and Electronic Sector: Relationship between Enthusiasm of Top Managers and Level of Improvement

	Improvement Level A	Improvement Level B	Improvement Level C
Level of top management enthusiasm a	6	1	
Level of top management enthusiasm b	3	2	1
Level of top management enthusiasm c			1

Table 4-5. Food Processing Sector: Relationship between Enthusiasm of Top Managers and Level of Improvement

	Improvement Level A	Improvement Level B	Improvement Level C
Level of top management enthusiasm a	2		
Level of top management enthusiasm b	2	3	3
Level of top management enthusiasm c			3

Source: Both tables above are compiled from the *Master Plan Study for Quality/Productivity Improvement in the Republic of Tunisia* (Final Report, July 2008), available from JICA homepage (http://www.jica.go.jp/).

Note: The meanings of improvement levels A, B and C are the same as explained in the notes under Table 4-3. a, b and c indicate the level of enthusiasm of top management regarding quality/productivity improvement activities: ìaî indicates very enthusiastic, ìcî indicates rather passive and conservative, and ìbî indicates somewhere in between.

3) Basic technologies, including Japanese kaizen techniques for quality/productivity improvement were transferred to the counterparts

During the PP implementation period, the JICA consultants transferred basic *kaizen* techniques including Japanese improvement techniques to the counterparts and PP target companies via "On the Job Training" (OJT) on production lines. Table 4-6 shows the types of *kaizen* techniques learned and that can provide continued guidance for production managers and quality controllers in Tunisian companies.[77]

[77] The technologies and techniques transferred to the Tunisian side in this project were extremely basic, and there are numerous other techniques for improving quality and productivity. It is anticipated that further improvement techniques will be acquired during the next phase of technical cooperation.

Table 4-6. Types of Improvement (*Kaizen*) Techniques that were Acquired in the PP and can be Autonomously Used by Counterparts in Future

№	Improvement Technique	Contents of Improvement Technique
1.	Layout improvement	PQ analysis / Transfer distance analysis / Process proximity analysis[78]
2.	Improvement of work human-hours balance	Time research (stopwatch method) / Operation research
3.	Shortening of setup times	Single setup (SMED) method / Vide analysis[79]
4.	QCCs[80]	Analysis using 7 tools of QC / 7 areas of waste elimination[81]
5.	5S[82]	Tag method / Color display / Visual control / Dividing lines

Source: Compiled from the *Master Plan Study for Quality/Productivity Improvement in the Republic of Tunisia* (Final Report, July 2008), available from JICA homepage (http://www.jica.go.jp/).

Since the counterparts compiled the manual describing these *kaizen* techniques under guidance from the JICA consultants during the PP period, they were able to gain understanding of the improvement techniques from both theoretical and practical viewpoints. In future, it is anticipated that counterparts will inform each other to further advance improvement techniques in these five areas, and build up diagnostic and guidance experience in company production environments. This will allow them to nurture young engineers in their own Technical Centers (CETIME, CTAA) as well as in other sector Technical Centers.

The *kaizen* techniques indicated in Table 4-6, i.e. layout improvement, improvement of the work human-hours balance, shortening of setup times (SMED), QCCs and 5S, have produced particularly good results in the electrical and electronic sector. Among these techniques, 5S is an effective technique in all companies across all sectors, and around half the targeted companies that applied it in the food processing sector experienced positive results. In Japan, 5S is the most basic *kaizen* technique for quality/productivity improvement and has been disseminated to almost all sectors, regardless of the size of the enterprise. The Toyota Production System established by Toyota Motor Corporation has generated outstanding results in terms of quality/productivity improvement, and the 5S occupies an important position within this.

[78] PQ analysis is an analysis technique that entails drawing P-Q charts (with the types of products targeted in production P on the horizontal axis, and quantities Q on the vertical axis) and using them as the basis for layout planning.

[79] SMED, which stands for Single Minutes Exchange of Die, is a method for eliminating wasted time in manufacturing processes.

[80] QCC (Quality Control Circle) refers to small groups of frontline workers organized with the goal of continuously managing and improving the quality of products, services and work. There are three basic principles of activity: 1) exercising human ability and bringing forth unlimited potential, 2) valuing human nature and creating cheerful workplaces where people feel rewarded by their work, and 3) contributing to improvement and development of the company's stature (According to the Japan Industrial Management Association publication "Dictionary of Production Management Terms, Japanese Standards Association," 2005, 3rd edition (the first edition was published in 2002)).

[81] In QC activities, data is frequently collected and quality improvement issues are tackled based on the information obtained. The basic tools used to read various kinds of information from data are referred to as the "7 tools of QC" and include Pareto diagrams, check sheets, histograms, scatter diagrams, control drawings, graphs and cause and effect diagrams.

[82] 5S is taken from the initial letters of the Japanese words *Seiri* (sorting), *Seiton* (systematic arrangement), *Seiso* (sweep), *Seiketsu* (scrub) and *Shitsuke* (self-discipline). *Seiri* (sorting) refers to sorting necessary items from unnecessary items and tidying up the items that aren't needed. *Seiton* (systematic arrangement) infers preparing items in their set positions so that necessary items can be immediately used when they are needed. *Seiso* (sweep) refers to the removal of foreign materials from necessary items. *Seiketsu* (scrub) refers to the maintenance of a clean state through repeated implementation of sorting, arrangement and cleaning. And *Shitsuke* (self-discipline) refers to always conforming to the things that have been decided (Japan Industrial Management Association, 2005).

4) Guidance manuals concerning quality/productivity improvement were prepared

Under guidance from JICA consultants, the counterparts themselves compiled the improvement techniques they learned via OJT into manuals to guide quality/productivity improvement for the electric and electronic, and food processing sectors, in both English and French. On completion of the overall project in July 2008, the manuals in Arabic were also finished. This will be utilized by the counterparts when they conduct guidance of quality/productivity improvement to technical staff of the public Technical Centers, as well as production line managers in Tunisian companies.

[Phase 3: November 2007 - July 2008]

In Phase 3, based on the results of the fact-finding survey of companies in Phase 1 and results of PP implementation in Phase 2, the master plan and action plan including institution building for disseminating the *kaizen* techniques were formulated. Within the master plan, the following four points were proposed:

1) Strengthening general quality capability;
2) Promoting trainers' training;
3) Raising awareness among top management; and,
4) Establishing an information dissemination setup (through a core organization).

These recommendations are outlined in the following paragraphs.

1) Strengthening general quality capability

Quality has a number of aspects. The type of quality targeted in the project in Tunisia was "quality of manufacture."[83] In other words, it referred to the quality of products manufactured by processing materials and assembling parts. However, no matter how good assembly technology is, good products cannot be made if the quality of parts is poor. Also, customer satisfaction cannot be attained with poor designs. In order for products of sufficient quality to prevail amidst international competition, it is necessary to improve "quality of manufacture," "quality of parts" and "quality of design." There is also the question of the "quality of marketing." Therefore, in order to make products that provide satisfaction to customers at home and abroad (the final users), it is necessary to approach quality improvement from a comprehensive viewpoint.

Particularly in Tunisia, since most parts and materials for manufacturing companies are imported from Europe, and these are processed and assembled into products for exporting back to Europe, the processes conducted in Tunisia have the lowest added value within the value chain. Accordingly, with a view to one day enabling Tunisia to make its own parts and implement higher value adding design processes, it was recommended that general quality capability be strengthened.

[83] "Quality of manufacture" is also referred to as the actual quality or the quality of finished products and services that are manufactured or provided with a view to realizing the quality of design. "Quality of design" refers to the target quality aimed for in the manufacture and provision of products and services.

2) Promoting trainers' training

In order to widely disseminate the *kaizen* techniques that were transferred in the PP, not only to staff of the public Technical Centers but also to the companies of Tunisia, since the absolute number counterparts is not enough, it is necessary to develop many more trainers. OJT on production lines is the most effective method for nurturing trainers, and recommendations were given on how counterparts who received transfers of technology in the PP should develop trainers (mainly technical staff from the Technical Centers) and production line managers with Tunisian companies via OJT.

3) Raising awareness among top management

In order to achieve quality/productivity improvement, it was confirmed in the PP that changing the awareness of top management is the most important point. So how can managers be encouraged to change their awareness? It was proposed that guidance be carried out via OJT on production lines and through effective training programs for managers.

4) Establishing an information dissemination setup (through a core organization)

In order for Tunisia to improve its international competitiveness in future, quality/productivity improvement is one of the most important issues it must tackle. There is no core organization at present to widely disseminate *kaizen* techniques and know-how to industries in Tunisia. It was proposed that the UGPQ under the Ministry of Industry, which was the direct counterpart agency in the project, become the core agency and work with other related agencies in establishing an information dissemination setup to help realize recommendations 1) – 3).

2. Lessons from the project in Tunisia: Conditions for success

More than half of the PP companies got better than expected results, while some PP companies did not. What were the reasons behind those results? The following lessons were identified through the PP implementation.

1) The best results were realized in those companies where top management and production line managers (production managers and quality controllers) both had high levels of awareness regarding quality/productivity improvement and, furthermore, worked positively towards making changes. Conversely, companies where top management and production line managers held a passive attitude towards quality/productivity improvement did not improve much. The commitment level of top management is therefore especially important.[84]

2) The positive attitude of the counterpart, including agencies (MIPME and UGPQ) and the technical staff of the public Technical Centers, toward the acquisition and dissemination of *kaizen* techniques contributed to achieving overall PP outputs.

[84] Dr. W. Edwards Deming says "Where is quality made? Quality is made in the boardroom." (Rafael Aguayo, foreword by W. Edwards Deming (1991) *Dr. Deming: The American Who Taught the Japanese About Quality*, Fireside, New York)

3) It is indispensible for the consultants responsible for conducting the transfer of technology to have ample expert knowledge and guidance experience concerning quality/productivity improvement.[85] In the case of the project in Tunisia, JICA consultants possessed experience of factory management in Japan and other parts of Asia, as well as guidance of quality/productivity improvement in Asian companies.

4) It is essential to have teamwork between the three stakeholders (top management and production line managers of companies, counterparts including agencies, and the consultants conducting the transfer of technology) who are all aiming for quality/productivity improvement (In the case of the project in Tunisia, the PP companies where this teamwork functioned well were able to produce good improvement outputs, especially in electric and electronic sector).

3. Japan's experience: How has Japan implemented quality/productivity improvement?

Japanese industries were in a state of devastation at the end of WW2 (around 60 years ago). At that time it was necessary to immediately modernize machinery and equipment and to promote the innovation of production management. In spite of the extremely low level of manufacturing technology, the Japanese continued to make products. Labor costs were certainly low at this time, however, the quality of products was so poor that they were not fit for export. In overseas markets, Japanese products had the reputation of being cheap and of poor quality. For example, Japanese watches did not keep time, shoes soon became ragged, and radios were prone to making annoying noises. However, today, Japanese products are internationally recognized for their high quality. During the intervening period, Japan advanced research and development of its own unique *kaizen* techniques geared to improve levels of quality and productivity. A number of these techniques have become internationally famous, for example, 5S, QCCs, the 7 tools of QC, visual control, the Toyota Production System and so on. The private sector was first to take the initiative in improving quality and productivity in Japan, then academics provided theoretical cooperation, while the government provided indirect and direct support to complete the three-way collaboration among industry, government and academia. Here, we will discuss the ways in which Japan improved quality and productivity in the postwar era.

3.1. Quality and productivity improvement movement in Japan

Quality improvement movement

Concerning quality control, large disparities between Japan and the United States (US) were strongly recognized soon after the war, and Japanese industrial and academic circles displayed a strong interest in the advanced quality control techniques of America. The Union of Japanese Scientists and Engineers (JUSE[86]) was established in 1946 in order to introduce and disseminate

[85] When discussing transfer of technology, the focus tends to be on the ability of those receiving and absorbing technology, however, attention should also be paid to those providing the specialist technical capability.
[86] <http://www.juse.or.jp/> Retrieved December 2008.

American scientific quality control techniques in Japan. In 1950, JUSE first invited and received guidance from Dr. W. Edwards Deming who proposed quality control based on statistical techniques. Industrial leaders were very interested in these techniques and records of his lectures became the first manual for spreading quality control in Japan. He had been invited to Japan every year since then.[87] Dr. Deming donated the royalties from those records to a fund that was used in 1951 to establish, within JUSE, the Deming Prize for companies realizing outstanding success in the field of quality control. Although the Deming Prize was instigated by a private sector organization, it had honorary significance for Japanese companies and became the best possible advertising tool for selling high quality products in both Japanese and overseas markets. Winning this award became a major objective for many Japanese companies at this time, and it played an important role in raising the quality control level of Japanese companies. Furthermore, since academics conducted research and investigation into quality improvement and the government supported the efforts of industry and academia, the movement towards quality improvement in Japan truly involved all elements of society.

In Japan, November is designated as Quality Month, and during this time symposiums on quality control, lecture meetings and various other events involving the public are staged throughout the country. The Deming Prize is also awarded in November.[88]

Tunisia is now in the process of devoting nationwide resources towards creating a culture of quality.

The Tunisian Government has established an award system for companies displaying excellent results in quality improvement, as well as the first ever "Quality Grand Prix" awards presented to private sector companies in March 2008. A "Quality Week" has been established during March and during this time seminars and symposiums are staged and the Presidential Grand Prix awards ceremony is held.

Productivity improvement movement

Concerning improvement of productivity, Japan was influenced by the productivity movement in Europe.

[87] "Deming predicted that within five years Japan would be economically competitive and that consumers worldwide would clamor for Japanese goods. While many were skeptical, the presence of an American expert was compelling. In order not to lose face they faithfully followed his instructions. Within eighteen months of the first lecture the Japanese saw tremendous improvements in the quality of their goods and in productivity. They beat Deming's five-year timetable with a year to spare." (Rafael Aguayo, 1991)

[88] The Japanese Deming Prize and Quality Month have influenced quality improvement activities in countries throughout the world. In the US, starting with the establishment of the Malcolm Baldridge National Quality Award in 1987, October was designated as the Quality Month in the US and Canada in 1988. During this month, quality improvement activities are implemented all over the country and these activities are recognized as having contributed to economic recovery. Moreover, on the second Thursday of November, which has been designated as World Quality Day at the suggestion of the United Nations, quality improvement activities are carried out all over the world. Concerning standardization too, World Standard Day was established to coincide with the standardization month of October in Japan in 1969, and standardization reinforcement activities are implemented throughout the world during this month (see http://www.juse.or.jp/).

In the United Kingdom (UK), based on the belief that elucidating the secret of America's high productivity and applying it to British industry was the fastest way to postwar economic reconstruction, a productivity center was established and American management methods for raising productivity were introduced and disseminated. The US gave strong support to these efforts in the UK. These activities spread to other European countries and the European productivity headquarters was established in 1951. The basic approach to improving productivity here entailed the simultaneous maintenance and expansion of productivity and employment based on harmonious labor relations, and it aimed to realize fair distribution of outputs between top management, workers and consumers.

Inspired by such developments in the advanced countries of Europe and America, the momentum to advance productivity improvement gained pace in Japan too. This culminated in the establishment of the Japan Productivity Center (JPC) comprising top managers, workers and academics in 1955. The JPC dispatched numerous missions to the US to collect information and materials on American production management methods. This information then became common knowledge for many companies following the dissemination of such information in report meetings and seminars. At the start, major corporations were primarily involved in such activities, however, small and medium enterprises also became involved later on. Based on harmonious labor relations, various modern types of equipment were introduced and American management systems were adopted. The objective here was to effectively and scientifically utilize resources, labor and equipment in order to reduce production costs, expand markets, boost employment and enhance real wages and the standard of living, and thereby to enhance common benefits for management, workers and general consumers. Since this coincided with the start of Japan's era of rapid economic growth, productivity improvement signified the expansion of markets and production as well as growth of employment and introduction of modern equipment and facilities. In addition, disputes did not arise between labor and management.

The JPC was given the objective of approaching the productivity movement from a broader social and international perspective and forming national consensus for the reform of socioeconomic systems.

Quality improvement and productivity improvement: Higher quality leads to higher productivity (Dr. Deming)

As mentioned previously, in Japan, nationwide movements for promoting quality improvement and productivity improvement have been advanced through the initiative of both JUSE and JPC. In addition to these two organizations, various other private sector organizations and research institutes have worked on improving quality and productivity. Needless to say, many corporations have also developed their own unique systems, as in the case of Toyota Motor Corporation which developed the Toyota Production System (TPS) including Just-In-Time (JIT).

What is the difference between quality improvement and productivity improvement, and how are

the two related? A detailed explanation will not be given here, however, what is clear is that when quality improvement is advanced, productivity improvement follows,[89] and vice versa. In reality, JUSE, which has promoted quality improvement, has various training programs and has also worked on *kaizen* techniques for quality improvement as well as productivity improvement, while the JPC has established the Japan Quality Awards system and encourages quality improvement in corporate management. In recent times, many work areas of the two organizations have come to overlap. Even when quality improvement and productivity improvement are advanced separately, the end results eventually overlap with each other.

3.2. Cooperation among industrial sector, academia and government

As has been described above, in Japan, in both quality and productivity improvement, first the industrial sector played a central role in instigating the movement. Then academic circles offered support for surveys and research in the field, in combination with governments who backed up struggling areas in the industrial sector. An important feature of Japan's experience is that industrial sector, academia and government collaborated on improving both quality and productivity. (In Tunisia's case, the government has taken the initiative and is striving to employ a quality/productivity improvement movement throughout the nation while collaborating with industry and academia.)

3.3. Policies and measures for the promotion of industrial technology

Since Japan was not blessed with natural resources, it had to rely on so-called processing trade, whereby resources and raw materials were imported from abroad, processed and exported, in the postwar years. For this reason, policies and measures were adopted with a view to raising the overall level of industrial technology including processing technology. In addition to the aforementioned promotion of quality/productivity improvement, the following policies and measures were taken.

1) Introduction of the diagnosis and guidance system

A system for introducing management diagnosis to small and medium enterprises, conducting management improvement based on results, and offering technical guidance as well as advice and guidance on the modernization of machines and equipment was introduced. Under this system, small and medium business owners in regional areas were able to receive diagnosis, advice and guidance services concerning management and technology from advisors belonging to local governments.

2) Establishment of public test and research agencies

Public test and research agencies at the national and local government level were established all over the country, and test and research activities were conducted according to local industrial

[89] Dr. W. Edwards Deming maintained that if quality improves, rework will be reduced, mistakes will be lessened, there will be less delays, nonconformities and wasteful use of machines and materials, and as a result costs will be reduced and productivity will be improved (Mary Walton, 2000), (1st ed., 1994).

needs. Moreover, such agencies could respond not only to the everyday technical inquiries of local companies, but they could also work to resolve technical problems faced by local industries. In recent times, public test and research agencies are advancing research and development geared to promoting local industries in new fields in collaboration with local universities.

3) Enactment of the Export Inspection Law

In the years immediately following the war, Japanese products were subject to endless complaints from overseas markets for being bad quality or imitations of western products. In order to deal with this, the Japanese Government enacted the Export Control Law and introduced an export quality inspection system. This led to enactment of the Export Inspection Law making it necessary to inspect the quality of all products before export. Thanks to this system, all poor quality products were driven out and the flow of complaints regarding the quality of Japanese products were stemmed.

4) Establishment of the Industrial Standardization Law

In authorizing the JIS (Japanese Industrial Standards) mark, rather than simply reviewing the specifications of products, inspections came to be carried out on the state of quality control and machines and equipment in production plants and reviews focused on whether or not plants satisfied the applicable standards. In particular, for small and medium enterprises, since products carrying the JIS mark were seen to have quality recognized by the state, this became a major advantage when selling to consumers and a lot of interest was paid to acquiring the JIS mark.

5) Enactment of the Machine Promotion Law

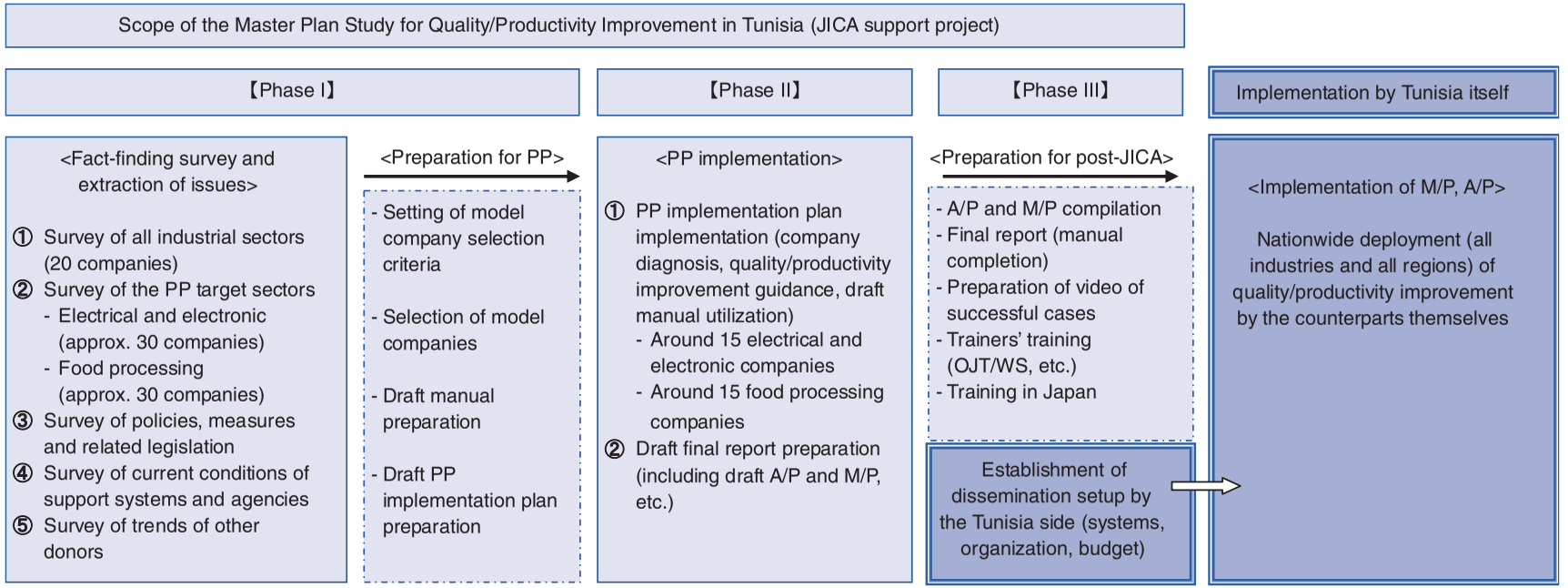
In postwar Japan, based on the view that promotion of the machine, electrical and electronic industries was important in terms of industrial strategy, first legislation was established, and then industrial sectors were designated with a view to widely promoting parts industries. As a result, modernization of supporting industries constituting the base of Japan's machine, electrical and electronic industries was advanced and this proved extremely effective in improving the standard of technology.

6) Enactment of the Basic Technology Promotion Law

Leaving aside the machine, electrical and electronic industries, in other industrial sectors, so long as machines and equipment are used, it is essential to manufacture and supply parts that constitute them. Moreover, since high quality parts tend to be demanded in order to realize differentiation, it is necessary to promote and evolve base technologies that go into making such parts. Against such a background, legislation was established with the objective of developing the basic technologies of casting, pressing, dies, welding and machining among others.

Summing up, it can be seen that government policies and measures had beneficial impacts both directly and indirectly on quality/productivity improvement and helped boost the international competitiveness of Japanese industries in the postwar years.

[Reference Materials] Overall View of the Master Plan Study for Quality/Productivity Improvement in Tunisia



Note: -PP: Pilot Project, M/P: Master Plan, A/P: Action Plan, OJT: On the Job Training, WS: Workshop
-This figure was prepared at the start of the project (July 2006). Accordingly, the numbers of companies in each PP target sector and companies targeted in the PP are the original numbers.
-Light blue areas refer to components (activities) assisted by JICA, and dark blue areas refer to future actions to be taken by the Tunisian Government.

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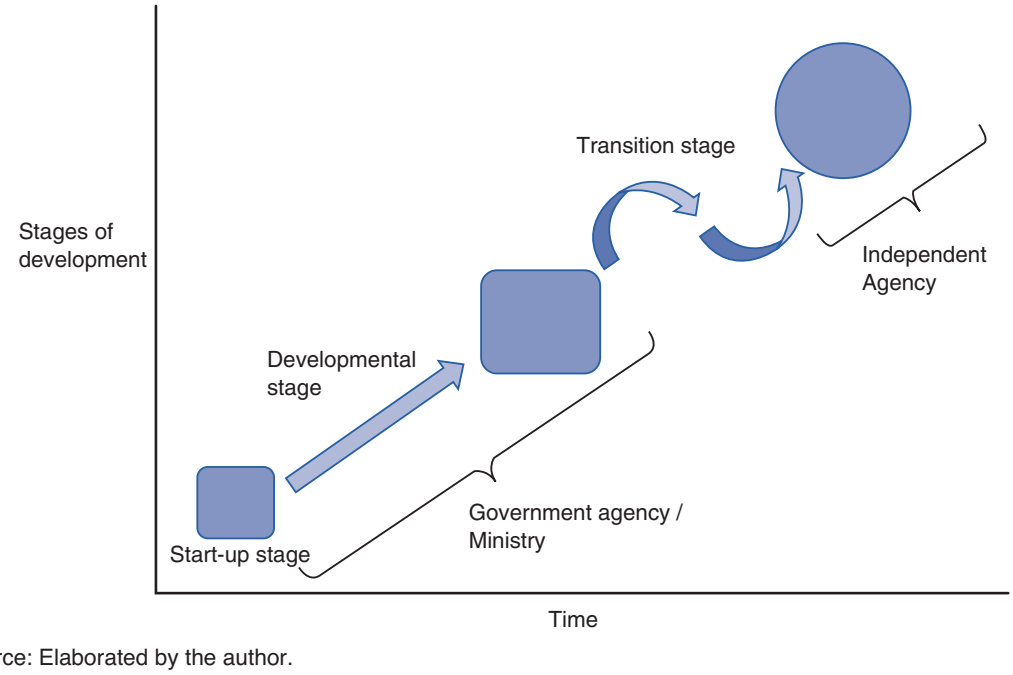
Chapter 5
Productivity and Quality Improvement: JICA's Assistance in *Kaizen*

Takafumi Ueda

Japan International Cooperation Agency (JICA)'s assistance in *kaizen*[90] dates back to 1983 when it started a project in Singapore. Its assistance on this theme evolved over the years to cover countries in various regions of the world. In addition to implementing projects, JICA has sent short-term and long-term experts on productivity and quality improvement missions. JICA also provides training courses on this subject in Japan (e.g. "Group Training"), in other countries ("Third-Country Training"), and via TV conference ("JICA-Net") connecting Japan and participating countries.

In most cases, productivity and quality improvement is the project's main purpose (i.e. "*kaizen*-only" projects); in others, this forms a component of the project. In cases of *kaizen*-only projects, JICA has supported its counterpart, such as a national productivity agency, in its capacity development. Such *kaizen* projects can be categorized according to the development stages of the counterpart organization, i.e. the start-up, developmental and transition stages. Besides country specific projects, there has been a regional project that has covered several countries.

Figure 5-1. Stages of Development for National Productivity Organizations



Source: Elaborated by the author.

[90] In this chapter, "productivity and quality improvement" and "*kaizen*" are used interchangeably.

Table 5-1. List of JICA *Kaizen*-only Projects

	Country	*Project Title*	*Project Start Year*	*Project End Year*	*Counterpart Organization*	*Year Established*	*Stage of Organizational Development under JICA Support*
1	Singapore	Productivity Development Project	1983	1990	National Productivity Board	1972	Developmental
2	Philippines	Productivity Development Program for the Philippines	1991	1994	Productivity Development Center, Development Academy of the Philippines	1967	Developmental
3	Thailand	Quality and Productivity Improvement Project	1994	2001	Thailand Productivity Institute	1962	Transition
4	Hungary	Productivity Development Project	1995	1999	Hungarian Productivity Centre	1994	Start-up
5	Brazil	Brazilian Institute of Quality and Productivity Project	1995	2000	Brazilian Institute of Quality and Productivity in Paraná	1995	Start-up
6	Costa Rica	Productivity Improvement for Enterprises Project	2001	2006	Technical Instructor and Personnel Training Center for Industrial Development for Central America	1992	Developmental
7	Tunisia	Study on the Master Plan for Quality/Productivity Improvement	2006	2008	National Quality Programme Unit	2005	Start-up
8	Paraguay	Project of Strengthening of Paraguayan Quality and Productivity Center	2007	(on-going)	Paraguayan Quality and Productivity Center (CEPPROCAL)	2005	Start-up
9	Egypt	Productivity and Quality Improvement Center Project	2007	(on-going)	Productivity and Quality Improvement Center	2006	Start-up
10	Argentina	Study on the Diffusion Plan for Business and Production Management Technology for Small and Medium Enterprises	2009	(on-going)	National Institute of Industrial Technology (INTI)	1957	Developmental

Source: JICA, as of August (2009).

1. The first JICA project on *kaizen*: Supporting the developmental stage of National Productivity Board in Singapore

The Productivity Development Project in Singapore was implemented from 1983 to 1990. Since its counterpart agency, the National Productivity Board (NPB), had been established in 1972, JICA's assistance was provided during NPB's developmental stage. The project's high profile may derive from the then Prime Minister Lee Kuan Yew's personal request (it is said), to the then president of the Japan Productivity Center (JPC) which became responsible for this project on the Japanese side.

Before the project started, Singapore's National Productivity Committee, consisting of representatives of employers' and workers' organizations, the Government and academia, made a recommendation to establish four principles of the productivity movement in Singapore in April 1981[91] as follows:

1) Productivity improvement will increase employment;
2) Labor and management will cooperate in order to consider and implement concrete steps to improve productivity;
3) Employees will receive re-training as productivity improves; and
4) The fruits of productivity improvement will be fairly distributed among management, workers and consumers.

The JICA project developed the capacity of NPB in (a) management and supervisory training, (b) training in labor-management relations and small group activities, (c) occupational safety and health, (d) promotion of productivity, (e) development of resource centre, and (f) planning and research. Such capacity development was conducted through practical guidance, development of training materials, model/pilot company projects, seminars and workshops, preparation of papers, and fellowship training.

As it was JICA's first *kaizen* project, Japanese experts and their Singaporean counterparts had a difficult time at first. The Japanese, assuming that the same steps should be taken in Singapore as in Japan, started to instill basic concepts and principles in the Singaporean counterparts. They believed that it was necessary to take this step in order to form a solid base before teaching concrete methods of productivity improvement. However, the NPB management was eager to achieve tangible results which had not materialized after one year of the project had passed. Part of the reason for NPB's demand for quick results could be that the Prime Minister had paid close attention to the project. Based on the discussions between JICA and NPB, the role of the Japanese partners changed. They no longer just trained their Singaporean counterparts in classrooms; they were now providing services to enterprises side-by-side with their counterparts. In other words, they adopted

[91] Three guiding principles of productivity improvement in Japan, set out in 1955, were: 1) expansion of employment, 2) cooperation between labor and management, and 3) fair distribution of the fruits of productivity. <http://www.jpc-sed.or.jp/eng/mission/principle.html>

an on-the-job training method so that the counterparts were able to experience and learn how their jobs could be done.[92] With this approach, the NPB staff, with the support of JICA experts, was now achieving tangible results at the enterprise level.[93]

Besides providing training and consultancy services, NPB undertook major promotional activities. For example, on 8 November 1985, Prime Minister Lee launched Productivity Month '85 to raise awareness and promote a "productivity culture" among workers, managers and government officials. "Quality Day" events were held at various companies and locations, seminars were held, and an international exhibition of the quality circle convention was organized by NPB. These events were extensively covered by the mass media.[94]

JICA's assistance to NPB is considered a successful case of transferring "productivity technology."[95] The NPB acquired the capacity, not only to conduct productivity-related activities in the country, but also to provide productivity training for other countries. For example, they provided group training courses on productivity from 1990 to 1995 on behalf of JICA. From 1997 to 2000, they organized productivity management courses in Singapore for 70 trainees from Southern African Development Community (SADC) countries.[96]

In 1996, the NPB was merged with the Singapore Institute of Standards and Industrial Research to form the Productivity and Standards Board (PSB). In 2002, PSB assumed a new responsibility to promote innovation in Singapore and became known as the Standards, Productivity and Innovation Board (SPRING Singapore).[97]

2. Start-up and transition support

JICA's assistance in the start-up stage has been seen in Hungary, Egypt and Brazil. The Productivity Development Project in Hungary began in 1995 after the Hungarian Productivity Centre was established in the previous year. Until the project ended in 1999, in-company facilitators were trained, company-level cases of short-term and long-term consultations were documented and *kaizen* was promoted publicly. The technical capacities of the Centre's staff were upgraded and the network of experts was expanded. In Egypt, the Productivity and Quality Improvement Center nicknamed the "*Kaizen* Center" was established in 2006 and the JICA project started in 2007.

[92] Japan Productivity Center (JPC) (1990) "Singapore Productivity Improvement Project: Report on Technology Transfer Concept and Practice (a report in Japanese; the original title "Shingaporu Seisansei Kojo Purojekuto: Gijutsu Iten no Rinen to Jissen ni Kansuru Hokokusyo")."

[93] Under this project, a total of 149 short-term and long-term Japanese experts were sent to Singapore, and a total of 152 people from Singapore were trained in Japan (The Joint Evaluation of the project was attached as Annex 6 to the above JPC report).

[94] Joseph Prokopenko (1987) "Productivity Management; A practical handbook." International Labour Organization, Geneva. pp.261-2.

[95] Japan Productivity Center, ibid.

[96] Trainees came from Angola, Botswana, Congo, Ghana, Republic of Kenya, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.

[97] <http://www.spring.gov.sg/>

Before the JICA project was started in Brazil, in 1990 the Government of Brazil started to implement the Brazilian Program of Quality and Productivity (PBQP). This sought to improve the quality and productivity of enterprises through deregulation and liberalization policies, including privatization of public enterprises and the introduction of foreign investments. Against this background, the Government decided to establish five Institutes of Quality and Productivity, one of which was established in the Paraná State in 1995. Based on the Government's request, JICA implemented a project from 1995 to 2000 to build staff capacity in the Brazilian Institute of Quality and Productivity in Paraná (IBQP-PR) through seminars and training, as well as through on-the-job training (OJT). In 2002, the IBQP became "a non-profit private entity formed by associated companies, governmental and non-governmental organizations entrepreneurial and workers' representatives, technical and scientific institutions, universities and citizens."[98] The *ex-post* evaluation conducted in 2004 showed that a positive impact was made; 61% of the companies surveyed confirmed their satisfaction with the services provided by IBQP-PR and only 16% expressed dissatisfaction.[99]

An important point to make about the project in Brazil is that IBQP-PR adapted the productivity and quality improvement concept and established a unique concept of "Systemic Productivity" that was appropriate in the Brazilian context. This has been defined as "an integrated approach of the main factors related to the productive process: social, technological, cultural, economic and environmental issues."[100]

In Thailand, JICA's assistance was provided at the transition stage. The Thailand Management Development and Productivity Center (TMDPC) was established in 1962 with the support of the International Labour Organization (ILO). In 1995, it was transformed into a more independent organization, called the Thailand Productivity Institute (FTPI), in order to better serve private sector enterprises. This foundation was formed jointly by the Ministry of Industry and the private sector.[101] JICA's "Quality and Productivity Improvement Project" was implemented from 1994 to 2001 to enhance the capacity of FTPI in terms of productivity consulting services, human resource management and labor-management relations consultancy, research, and productivity campaigns and promotional activities.

3. Other forms of assistance

Creation of model companies

In the case of Tunisia, JICA took a different approach. In countries where *kaizen* was not well

[98] IBQP website: <http://www.ibip.org.br/portal/home/index.php?pag=1&PHPSESSID=5af59ad9c15f8876493176406e8d0eca> accessed on 9 June 2009.
[99] Rejane Ferreira dos Santos (2004) "Ex-post Evaluation Report on Brazilian Institute of Quality and Productivity (IBQP-PR)," JICA Brazil Office.
[100] ibid.
[101] This is why the English abbreviation of the institute includes an "F" for the Foundation.

known, it was necessary to demonstrate the effectiveness of the *kaizen* approach first. Tunisia provides a good example where JICA assistance was provided under such circumstances. In the project entitled "Study on the Master Plan for Quality/Productivity Improvement" (2006-08), after baseline surveys conducted, pilot interventions were made at selected companies. Based on the lessons learned from pilot activities, a master plan and an action plan were formulated. Further details of the project are explained in Chapter 4, including the results of productivity improvements at the enterprise-level. As a follow-up to this study, a new JICA project is to start in 2009 in order to assist the Government of Tunisia to implement these plans. From the latter half of 2009, JICA plans to take a similar approach in Ethiopia where the request for a *kaizen* project was made by Prime Minister Meles Zenawi.

In addition to studies and projects that are dedicated to *kaizen*, another type of assistance includes *kaizen* as one of many components in a project. In Bangladesh, for example, *kaizen* was piloted for the jute sector in "The Study on Potential Sub-sector Growth for Export Diversification." After six months, four model companies achieved an average of 11.0% production growth in their spinning sections and machine stoppage reduced by 45.7%. In their weaving sections, the result was a 13.4% increase in production and a 23.5% reduction in stoppage.[102, 103]

Table 5-2. Productivity Improvements in Bangladesh's Jute Sector

(Unit: %)

Company	Spinning		Weaving	
	Machine stoppage	Production	Machine stoppage	Production
A	38.8	18.4	27.7	13.0
B	24.2	13.6	11.1	15.1
C	53.8	6.2	19.8	9.8
D	65.9	5.6	35.5	15.7
Average	45.7	11.0	23.5	13.4

Source: JICA & Unico International Corporation (2009).
Note: Performance in six months from January 2008.

Regional approach

In Central America, JICA is taking a regional approach. Building on the achievements of the project to establish "The Technical Instructor and Personnel Training Center for Industrial Development for Central America in the Republic of Costa Rica" from 1992 to 1997, a new project entitled "Productivity Improvement for Enterprises in the Republic of Costa Rica" was implemented from 2001 to 2006. As explained in more detail, in Chapter 3, the project assisted the center (*Centro de Formacion de Formadores y Personal Tecnico para el Desarrollo Industrial de Centroamerica*; CEFOF) to deepen its expertise on *kaizen*. JICA is currently engaged in a new project with CEFOF

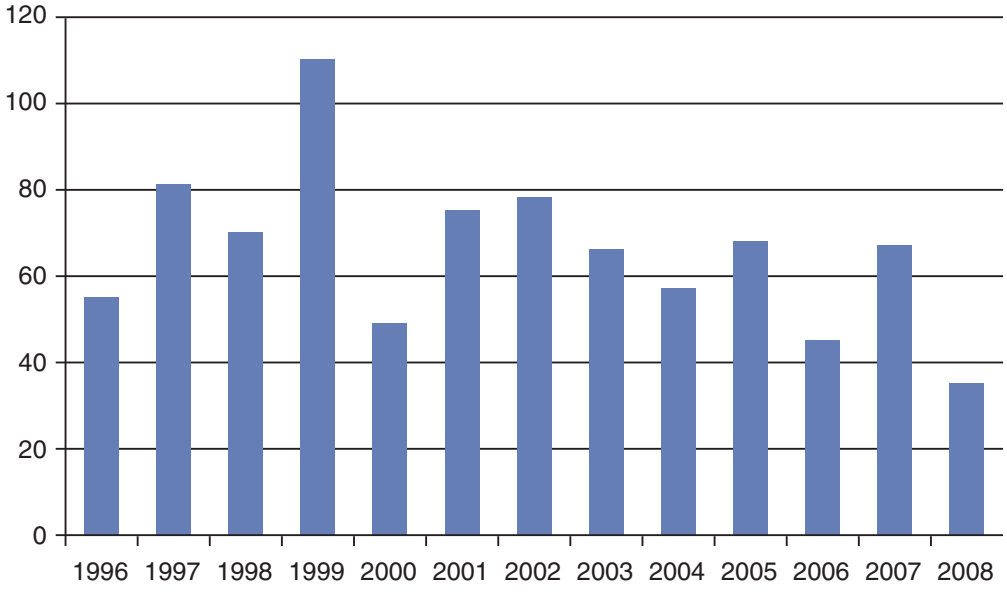
[102] JICA & Unico International Corporation (2009) "The Study on Potential Sub-sector Growth for Export Diversification in the People's Republic of Bangladesh: Pilot Project Completion Report." pp.1-38.
[103] Other examples of *kaizen*-as-a-component type of projects include "Project on Human Resources Development for Small and Medium-sized Enterprises in Armenia," "Project on Supporting Industries Development for Casting Technology in Indonesia," "Upgrading Project for Plastic Molding Tool Technology in the Philippines," and "Small and Medium Enterprises Supporting-Agency Reinforcement Project in Serbia."

to serve Guatemala, El Salvador, Honduras, Nicaragua, Panama, Belize, and the Dominican Republic.

Experts and training courses

Other forms of JICA's assistance on *kaizen* include organizing various training courses, as well as providing long-term and short-term experts[104] and Senior Volunteers. Training courses take place in Japan or in third countries, or through a TV conference facility called "JICA-Net."[105] The number of short-tem and long-term experts and training courses varies year by year, depending on the demand from recipient countries (Figure 5-2, Table 5-3). For example, 35 people were trained in seven courses on *kaizen* in 2008. Individual experts (i.e. those not attached to any projects) and Senior Volunteers to provide support in various aspects of *kaizen* have been dispatched to various parts of the world (Table 5-4). It is noticeable that there have been very few of them for Sub-Saharan Africa.

Figure 5-2. Number of Trainees in Japan on Productivity/Quality



Source: JICA.

Table 5-3. Number of Trainees and Courses in Japan on Productivity/Quality

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Trainees	55	81	70	110	49	75	78	66	57	68	45	67	35
Courses	15	25	15	21	8	13	12	11	8	9	9	11	7

Source: JICA.

[104] For JICA experts, "long-term" means one year or more, while "short-term" means less than a year.
[105] <http://jica-net.jica.go.jp/en2/index.html> The JICA-Net connects resource persons in Japan with the audience in other countries.

Table 5-4. Geographical Distribution of Individual Experts and Senior Volunteers on Productivity/Quality (1981-2008)

	Country	Experts	Senior Volunteers
Europe	Bulgaria	5	---
	Hungary	2	---
	Moldova	4	---
	Poland	15	---
	Romania	10	---
	Slovakia	3	---
	Ukraine	2	---
	Sub-total	**41**	**0**
Middle East	Bahrain	1	---
	Iraq	1	---
	Jordan	---	1
	Morocco	---	1
	Oman	6	---
	Syria	3	3
	Tunisia	3	1
	Sub-total	**14**	**6**
Africa	Ghana	---	1
	Malawi	---	1
	Zambia	---	1
	Sub-total	**0**	**3**
Asia	China	5	---
	India	3	---
	Indonesia	6	7
	Kazakhstan	12	---
	Kyrgyzstan	3	---
	Laos	---	1
	Malaysia	1	1
	Mongolia	10	1
	Nepal	---	3
	Pakistan	---	3
	Philippines	1	---
	Thailand	11	8
	Uzbekistan	11	---
	Vietnam	15	4
	Sub-total	**78**	**28**
Latin America	Argentina	3	6
	Bolivia	2	1
	Brazil	29	---
	Chile	5	1
	Costa Rica	2	2
	Colombia	9	1
	Dominican Rep.	---	5
	Ecuador	1	---
	El Salvador	1	---
	Honduras	---	3
	Mexico	3	2
	Paraguay	1	2
	Peru	---	1
	Uruguay	5	2
	Venezuela	2	---
	Sub-total	**63**	**26**
	Total (all regions)	**196**	**63**

Source: JICA.

4. Conclusion

Despite some initial misgivings, it has been demonstrated that *kaizen* can be put into practice in a variety of cultural settings. During the initial attempt in Singapore, JICA experts believed that introducing the productivity movement was the transfer of Japanese-style management practices. It was sometimes considered that various aspects of Japanese-style management were essential for the success of the productivity movement. However, we now know that *kaizen* can be applied in many parts of the world. JICA's experience in Asia, Latin America, Europe and now Africa, are testimony to this. It is also possible, even necessary, to adapt it to the local context, as the Brazilian case shows.

Kaizen centers evolve over time and JICA's assistance needs to correspond to the specific capacity development requirements of the time. The most dramatic, and perhaps most crucial period in the life of productivity centers, is that of the transition from a purely public institution to a private or semi-private entity. This transition derives, at least in part, from the dual role that *kaizen* centers are expected to play. On the one hand, the centers have a public role to disseminate *kaizen* movements in a country and implement activities to promote *kaizen* such as research and development. On the other, they have a private role, i.e. to provide private goods in the form of services to enterprises, whether through their own staff or by mobilizing expertise available in the private sector, so that they can enhance their competitiveness and profits. For the latter, the centers should be receiving fees from their client enterprises. It is often the case that public sector institutions either are not mandated to receive fees, or even if they can, the fees may be absorbed into the national treasury and have no bearing on the budget that the centers may be allocated. In such cases, it is desirable for the centers to be autonomous entities in order to provide effective services to enterprises. If not, for example, competent experts at the centers are likely to be recruited by private sector enterprises that can pay much higher compensation. At some point, countries need to develop and use private sector trainers and consultants who may be able to provide suitable services to client enterprises, beyond only having such expertise in-house. In such cases, the centers may play important roles in developing this expertise and continuing to spread *kaizen* messages.

Kaizen is "an attitude of the mind"; it is distinct from many other management tools. It is participatory; frontline workers are expected to contribute and benefit by using their brain power as well as their hands. It is practical; various tools such as 5S and QC circles are available for use. It is also complementary to other assistance such as the EU's assistance in introducing International Standards Organization (ISO) standards in Tunisia and the United Nations Industrial Development Organization (UNIDO)'s assistance on benchmarking in Ethiopia. If there is a request from developing countries, JICA will be able to share Japanese expertise in *kaizen*, as it is one of the areas where Japan has competitive advantages in providing assistance.

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