Emerging-Economy State and International Policy Studies

Izumi Ohno
Kimiaki Jin
Kuniaki Amatsu
Junichi Mori *Editors*

Introducing Foreign Models for Development

Japanese Experience and Cooperation in the Age of New Technology

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Foreword

As the twenty first century advances, the landscape of industrial development is radically changing. Globalization, digital transformation, and increasing concern for inclusive, sustainable, and resilient development are key drivers of such changes in the age of the Sustainable Development Goals (SDGs). The COVID-19 pandemic has further accelerated these mega-trends.

Such mega-trends present both opportunities and challenges for developing countries. On the positive side, developing countries can engage in industrial development in a broader scope. New business opportunities are open in terms of information and communications technology (ICT), green industries, and a variety of innovative technologies called 'Corona-Tech,' which could also contribute to reinforcing the resilience of society and realizing human security of people around the world. This means that latecomer countries today have more diverse paths to development. To make this happen, however, developing countries need to strengthen their policy and societal capacity to adapt to today's interdependent and connected world, while taking into account their unique circumstances.

History demonstrates the centrality of learning for industrial catch-up. To cope with development challenges under the new industrial landscape, it is important for developing countries to effectively learn from foreign models and adapt them to local situations, while exerting strong country ownership. This is a long-standing development issue. This book aims to address this classic question in the context of the twenty first century industrialization challenges in developing countries. To do so, it draws on Japan's experiences of past industrial catch-up and industrial development cooperation, extended mainly by the Japan International Cooperation Agency (JICA).

Needless to say, Japan is not the only model from which developing countries can learn. Developing countries can learn from the experiences of various countries, including successes and failures. Nevertheless, I believe that the perspectives and methods of learning foreign models that Japan as a non-Western country has cultivated since the nineteenth century and its rich experience of development cooperation are useful beyond time and place. It is against this background that the JICA Ogata Sadako Research Institute for Peace and Development has conducted the

research project, “Japanese Experiences of Industrial Development and Development Cooperation: Analysis of Translative Adaptation Processes.”

Learning from the past to shape the future together—I hope that this book will serve as a useful reference for national leaders, policy makers, practitioners, and researchers in developing countries, as well as the international community.

March 2023

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Preface and Acknowledgements

This book presents a new perspective and practical approach to learning and technology transfer for latecomer countries in the process of economic development. The key concept is translative adaptation, a terminology imported from cultural and economic anthropology, which stresses the indigenous perspective of a latecomer society and the local learning process it undertakes. Translative adaptation involves selectively adopting and adapting foreign knowledge and technologies to the specific conditions of the home society under the strong influence of dominant global trends. The book applies this concept to the context of industrial catch-up and development cooperation, which should be highly useful to today's latecomer countries. There are several reasons why this volume adds value to the existing research and debate on industrialization and development cooperation.

First, this book emphasizes pragmatism and the concrete '*how*' of learning—how developing countries can enhance policy and societal capacity to learn external knowledge and technology and adapt them to the local context, and how donors could facilitate such a process. Industrialization is a key driver of structural transformation in developing countries, as it generates sustained income, creates productive and decent jobs, and promotes knowledge spillover and technological innovation. Furthermore, the landscape of industrialization is rapidly changing with the digital revolution, increased social and sustainability concerns as embodied in the Sustainable Development Goals (SDGs), and, more recently, the COVID-19 crisis. There is renewed attention on the important role industry plays in structural transformation and post-COVID-19 recovery. Despite this heightened recognition and broadening scope of industrial promotion, there is a paucity of literature on the practical aspects of industrial catch-up and learning. This book fills that gap. It also considers the relevance of translative adaptation and local learning in the new landscape of industrialization.

Second, to explore the *how* of learning, the book builds on the perspective of Japan's past experiences and its extensive development cooperation in Asia, Latin America, and Africa at present. Since the late 19th century, Japan has developed a unique philosophy and method for adopting advanced technologies and systems from the West; essentially the same philosophy and method govern Japan's current

cooperation with the developing world. Japan's catch-up experiences since the Meiji modernization and during its post-war economic development have been characterized by learning and internalization of Western technologies and knowledge. The historical experience of Japan stimulated neighboring countries and generated a chain reaction of learning in East Asia, including the extensive copying of Japanese policies and institutions in Taiwan and Korea, and the 'Look East' policy of Malaysia. The Japanese approach to industrial development stresses real sector concerns with great attention to concrete industrial structures and the individual components of the market economy such as human resources, technologies, and excellent firms, in sharp contrast to general non-sector interests such as the overall business climate and level playing fields advocated by the West. This perspective is strongly reflected in Japanese development cooperation in Asia, Latin America, and Africa.

Third, the editors and authors of this volume are active practitioners of development cooperation with academic credentials. While coming from diverse backgrounds, we have all been engaged in building the nexus between research, policy, and practice through many years of work in various developing countries. By combining theory with concrete case studies, we would like to contribute to the practices of industrial policymaking in developing countries and the global debate on the proper role of developing country governments and bilateral and multilateral development partners. Concrete cases are provided not only from Japan but also from Asia, Latin America, and Africa, in the hope that our analysis is not just about Japan's industrialization in the past but will be useful to all developing countries today.

The book is divided into three parts, consisting of the following chapters: Part I provides an overview of translative adaptation in the industrialization process. It introduces key concepts, analytical frameworks, and Japanese perspectives on industrial development and development cooperation (Chap. 1), followed by a review of industrial policies for learning, innovation, and transformation, based on the experiences of Japan, South Korea, Malaysia, Brazil, and Chile (Chap. 2). Part II provides concrete case studies of translative adaptation and local learning in the industrialization process. These include: Japan's state learning in the Meiji period from the vision perspective (Chap. 3); national movements for quality and productivity in postwar Japan and Singapore (Chap. 4); Japanese cooperation for enhancing industrial policy capacity, based on the examples of Argentina, Vietnam, Ethiopia, and Thailand (Chap. 5); industry engagement in technical and vocational education and training (TVET) and Japanese cooperation in Vietnam (Chap. 6); the experience of Japan's *Kaizen* cooperation in Tunisia and Ethiopia (Chap. 7); and Thailand's experience of learning industrial technologies and *monodzukuri* education (Chap. 8). Part III considers translative adaptation in a changing world. It examines the role and relevance of *Kaizen* in the development of non-cognitive skills in Africa in the age of digitalization (Chap. 9), and the new industrial landscape and its implications for industrial policy and Japanese industrial development cooperation (Chap. 10).

This book is built on the results of a research project, 'Japanese Experiences of Industrial Development and Development Cooperation: Analysis of Translative Adaptation Processes,' conducted by the Japan International Cooperation Agency (JICA) Ogata Sadako Research Institute for Peace and Development (JICA Ogata

Research Institute). We would like to express our sincere gratitude to all who supported this research project and made this book possible. Although we cannot mention every name, we would like to thank the following individuals for their valuable insights and advice on our research: Prof. Emeritus Keiji Maegawa (Tsukuba University), Prof. Emeritus Masatake Wada (Teikyo University), Prof. Nobuaki Hamaguchi (Kobe University), Prof. Emeritus Toru Yanagihara (Takushoku University), Prof. Emeritus Hirohisa Kohama (Shizuoka University), Prof. Ali Akkemik (Fukuoka University), Prof. Ayano Nishihara (Rikkyo University), Prof. Shoko Yamada (Nagoya University), Mr. Kazuteru Kuroda (Japan Productivity Center), Mr. Sozo Yamamoto (Japan-Thailand Economic Cooperation Society), and Mr. Daisuke Kosaki (Thai-Nichi Institute of Technology).

We highly value the insights gained from the exchange of views with the African Union Development Agency-the New Partnership for Africa's Development (AUDA-NEPAD), in particular, Mr. Martin Bwalya, Ms. Pamla Gopaul, Dr. Bernice McLean, Mr. George Murumba, and Mr. Eiji Inui, as well as those from a series of study group discussions on 'The Future of Industrialization in Developing Countries' co-hosted by the National Graduate Institute for Policy Studies (GRIPS) Development Forum and the JICA Ogata Research Institute, with the participation of researchers and practitioners. We would also like to thank the Economic Development Department of JICA, which provided valuable comments on the manuscripts from practitioners' perspective at various stages of our research project.

Furthermore, we would like to thank the following individuals at JICA for their support, encouragement, and useful feedback on this research project: Dr. Akio Takahara, Mr. Koji Makino, Mr. Yasuhiko Sato (JICA Ogata Research Institute), and Mr. Juan Carlos Yamamoto (former deputy representative, JICA Argentine Office). Finally, we would like to express our deep gratitude and appreciation to the project team members: Mr. Minoru Yamada, who gave unwavering guidance as the co-leader of the research project, as well as Mses. Kanako Omi, Yoonjung Kim, Kae Yoshino, Saori Yamamoto (until April 2022), and Seiko Kaneko (until August 2020) of the JICA Ogata Research Institute, who as research coordinators, have provided effective assistance throughout the research project. Without their contributions, this book could not have been completed.

This research comes from our strong desire to strengthen the nexus between research and practice on the ground. We hope that the analyses in this book will serve as useful references for policymakers, practitioners, and researchers in developing countries as well as the international community. We also hope to continue to refine our analyses and research findings through interactions with these stakeholders. We believe that this is the essence of mutual learning and knowledge co-creation.

Tokyo, Japan
March 2023

Izumi Ohno
Kimiaki Jin
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About the Editors and Contributors

About the Editors

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Abbreviations

4IR	Fourth Industrial Revolution
ADB	Asian Development Bank
AfCFTA	African Continental Free Trade Area
AFTA	ASEAN Free Trade Area
AI	Artificial Intelligence
AKI	Africa Kaizen Initiative
AOTS	Association for Overseas Technical Cooperation and Sustainable Partnerships (Japan)
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
AUDA-NEPAD	African Union Development Agency-New Partnership for Africa's Development
BDS	Business Development Services
BNDE	Banco Nacional de Desenvolvimento Econômico (National Economic Development Bank) (Brazil)
BNDES	Banco Nacional de Desenvolvimento Econômico e Social (National Economic and Social Development Bank) (Brazil)
CASE	Connected, Autonomous, Shared, and Electrification
CBT	Competency-based Training
COVID-19	Coronavirus Disease 2019
CPA	Center for Enterprise Partnership
CRT	Classroom Training
DACUM	Developing a Curriculum
DX	Digital Transformation
EKI	Ethiopian Kaizen Institute
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária (Brazilian Agricultural Research Corporation)
EV	Electric Vehicle
FDI	Foreign Direct Investment
GRIPS	National Graduate Institute for Policy Studies (Japan)
GVC	Global Value Chain

HaUI	Hanoi University of Industry (Vietnam)
ICT	In-company Training
ICT	Information and Communications Technology
IDE-JETRO	Institute of Developing Economies, Japan External Trade Organization
ILO	International Labour Organization
IoT	Internet of Things
ISI	Import-substitution Industrialization
JDB	Japan Development Bank
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JMA	Japan Management Association
JPC	Japan Productivity Center
JTECS	Japan-Thailand Economic Cooperation Association Society
JUSE	Union of Japanese Scientists and Engineers
KEC	Kaizen Excellence Center (Ethiopia)
KPI	Key Performance Indicator
KPT	Kaizen Promotion Team
KU	Kaizen Unit
METI	Ministry of Economy, Trade, and Industry (Japan)
MIPME	Ministere de l'Industrie de PME (Tunisia)
MITI	Ministry of International Trade and Industry (Japan)
MNE	Multinational Enterprise
MOAC	Ministry of Agriculture and Commerce (Japan)
MOE	Ministry of Engineering (Japan)
MOHA	Ministry of Home Affairs (Japan)
MOI	Ministry of Industry (Ethiopia/Thailand)
NPB	National Productivity Board (Singapore)
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
OJT	On-the-Job Training
OSMEP	Office of SME Promotion (Thailand)
PAPA	Pan-African Productivity Association
PDCA	Plan-Do-Check-Act
POSCO	Pohang Iron and Steel Company (Korea)
QC	Quality Control
QCC	Quality Control Circle
QCD	Quality/Cost/Delivery
QPI	Quality and Productivity Improvement
R&D	Research and Development
SDGs	Sustainable Development Goals
SEZ	Special Economic Zone
SME	Small and Medium-sized Enterprise
TAI	Thai Automotive Institute

TICAD	Tokyo International Conference on African Development
TNI	Thai-Nichi Institute of Technology
ToT	ToT (Training of Trainers)
TPA	Technology Promotion Association (Thailand-Japan)
TPM	Total Productive Maintenance
TPS	Toyota Production System
TQM	Total Quality Management
TVET	Technical and Vocational Education and Training
UGPQ	Unité de Gestion du Program National de Promotion de la Qualité (Tunisia)
UGPQP	Unité de Gestion du Program National de Promotion de la Qualité et la Productivité (Tunisia)
UNIDO	United Nations Industrial Development Organization
USIMINAS	Usinas Siderúrgicas de Minas Gerais S.A. (Brazil)
WIT	Work Improvement Team
WTO	World Trade Organization

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Part I
Translative Adaptation in the Industrialization Process

Chapter 1
Introducing Foreign Models for Development: A Perspective from Translative Adaptation

Izumi Ohno

1.1 Introduction

Learning foreign knowledge and technology is essential for industrial catch-up by latecomer countries and their homegrown development. Acquiring and assimilating knowledge, skills, and technology that are widely known and practiced in the more advanced economies—which we call 'foreign models'—is extremely important and form the core of learning that latecomer countries must do [48]. About 150 years ago, the government of Meiji Japan (1868–1912) aggressively learned from abroad by sending study missions and inviting foreign advisers to make up for the knowledge and technology gap that had widened as a result of two centuries of national isolation during the Tokugawa shogunate era. At that time, no donor countries, or international organizations were present to provide support to latecomer countries in their acquisition of knowledge and technology. Rather, it was the age of imperialism and colonialism.

Today, developing countries entertain plentiful opportunities to access the frontier knowledge and best practices of other countries. There exist a variety of channels of technology transfer including market- and non-market-based ones. Foreign direct investment (FDI), purchase of turnkey plants and machinery, foreign license, and technical services are typical channels of market-based, inter-firm technology transfer, while development cooperation through official development assistance (ODA) is an example of a non-market based one. The international community has also embraced the importance of knowledge as a catalyst for development and has been actively sharing the 'best practices' of successful countries through

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donor-funded study tours, seminars, and scholarships to higher education providers,[1] Furthermore, with technological advances, the volume and timeliness of available information have dramatically increased.

Nevertheless, the speed of learning varies significantly among countries. Some countries learn fast while others do not, creating a divergence in the progress of economic development. As our recent analysis of the World Bank's income classification data show, although the number of middle-income countries has increased, only a handful had rapidly caught up to become leading high-income countries between 1987 and 2019 [42].[2] The analysis also reveals the long-standing challenge of African development. 23 of the 29 low-income countries are in Sub-Saharan Africa, and 20 of them have never moved up to the lower-middle income category over the past 30 years. Other recent research suggests that there has been an overall downward trend in the economic transformation of African countries during 2000–2019, with the shrinking role of manufacturing in favor of services and extractive industries and with poor productivity performance in the context of limited structural change [2]. Avoiding middle-income traps, overcoming premature de-industrialization, and achieving economic transformation in Africa remain a priority development agenda.

Transfer of knowledge and technology does not occur naturally from advanced to developing countries even in the age of globalization where information, finance, goods, and services flow freely on a global scale. This requires serious learning by local actors including policymakers, private sector, and the society, to study and internalize foreign knowledge and technology and adapt them to fit the reality of the recipient countries. We call this process *translative adaptation*, and we believe it is at the core of learning foreign models for development. How can developing countries effectively learn from foreign models and introduce them wisely for their

[1] Both multilateral and bilateral donors are giving importance to knowledge management and sharing activities. For example, the World Bank positions itself as a 'Knowledge Bank' of best practices within the field of development. Among bilateral donors, South Korea is actively engaged in the Knowledge Sharing Program through the Korean Development Institute (KDI) to share Korean development experiences with developing countries. Germany puts a high priority on supporting technical and vocational education and training (TVET) system in developing countries, based on its own experience. Norway (Norad) runs the Knowledge Bank to share its experience with managing oil for development. More recently, China established in 2017 the Center for International Knowledge on Development (CIKD) to communicate China's development knowledge. As for Japan, apart from policy dialogues (Chap. 5 of this book), the Japan International Cooperation Agency (JICA) has established a JICA Chair of Japanese Studies with leading universities in partner countries, and the JICA Development Studies Program (JICA-DSP) which invites future leaders in partner countries to Japan to learn about Japan's modernization and development experiences.

[2] Our analysis shows that despite an overall increase in the number of high-income countries during this period, Singapore, South Korea, and Israel are the only ones that caught up with the advanced countries during 1987–2019, if we use the very high-income threshold. Since the World Bank's high-income category is broad and includes countries with per capita GNI 12,500–85,000 USD or more, we have hypothetically created the USD 25,000 threshold for the very high-income category. The number of high-income countries based on the World Bank's income threshold increased from 30 (1987) to 61 (2019); but this is largely because of the participation of Eastern European economies in this category, after experiencing transition to the market economy. The total number of countries for World Bank income classification also increased from 148 (1987) to 193 (2019).

homegrown development? What is the role of development cooperation in facilitating their proactive learning process? These are key questions we would like to address in this book.

A rich body of literature highlight the centrality of learning, the importance of local learning, and a dual role of the government as a policy learner and a facilitator of societal learning through industrial policies [13, 42, 51, 58]. As such, policy capacity and societal learning are increasingly stressed as pre-conditions for successful catch-up. But it remains to be understood how latecomer countries can build internal mechanisms for such learning and create localized, new knowledge, through interactions with foreign models. While ample studies exist on market-based (firm-level) technology transfer [25, 38, 59, 60], few studies focus on the concrete *how* aspects of learning, especially policy learning by the government and the role of development cooperation. This book attempts to answer such pragmatic question from the perspective of Japan's past experience and its extensive industrial development cooperation in Asia, Latin America, and Africa.

The book is based on a premise that industrial policy contributes importantly to promoting indigenous and societal learning, which is essential for latecomer countries to attain industrial catch-up [42]. Our thinking is greatly inspired by two lines of thought: (i) Stiglitz and Greenwald's vision toward 'creating a learning society' which emphasizes the significance of local learning and the role of industrial policy in development [58], and (ii) Maegawa's theory of *translative adaptation* [29, 30], which stresses the indigenous perspective of a latecomer society and the local learning process it undertakes. Translative adaptation involves selectively adopting and adapting foreign knowledge and technologies to the specific conditions of the home society under the strong influence of dominant global trends. We apply this concept to the context of industrial catch-up and development cooperation. We also ask how this learning method should—or should not—be revised under the new landscape of industrialization as featured by digitalization and the Sustainable Development Goals (SDGs).

For three reasons, we believe that Japan can make useful intellectual contributions to the industrialization of developing countries by sharing its experiences of catch-up and development cooperation. First, Japan is the first non-Western industrializer, as the experiences of Meiji modernization and post-World War II economic development show. Based on the country's experiences, Japanese researchers, practitioners, and private sector have fostered distinctive perspectives and approaches to industrial development [40]. These include: (i) the importance of learning and selectively incorporating advanced technologies and knowledge into Japanese culture and systems (translative adaptation), and (ii) real-sector concern with concrete thinking, field (*gemba*) orientation, and close partnership between government and the private sector. Second, such historical experience of Japan stimulated neighboring countries and generated a chain reaction of learning in East Asia. Third, such perspectives have been strongly reflected in Japanese industrial development cooperation. Japanese researchers and aid practitioners have been deeply engaged in supporting the industrialization of developing countries for many decades, typically through intellectual

cooperation (including industrial policy dialogue), human resource development, and quality and productivity improvement.

As an overview to the entire book, this chapter introduces key concepts and analytical frameworks such as translative adaptation and local learning, policy and societal learning, and highlights the vital importance of learning foreign models for industrial catch-up, with strong country ownership and local adaptation (Sect. 1.2). It then revisits Japanese experiences of industrial development and development cooperation from this perspective and reviews the industrialization experiences of East Asia where the region-wide diffusion of learning took place (Sect. 1.3). The chapter also presents the approach and structure of this book (Sect. 1.4), as well as the summary of key findings emerging from the subsequent chapters and their implications in the age of new technology (Sect. 1.5).

1.2 Key Concepts and Analytical Frameworks

Development is an interactive process incorporating both 'foreign' and 'indigenous' elements [19, 47]. On the one hand, latecomer countries face the need to acquire the 'foreign' elements—such as modern technology, knowledge, and organizational structure—in such forms as aid, trade, and investment by the private sector. On the other hand, each country has 'indigenous' elements—such as values and social institutions unique to that country—that regulate and determine the effectiveness of imported items because the 'economy is embedded in society' ([52], p. 57). It is often the case that a dominant foreign system imposes its norms and rules on a local society and that the latter may be forced to accept them in the face of external pressure.

International transfer of knowledge and technology—especially from advanced to developing countries—is a typical case of this systemic interaction. For example, technology transfer through development cooperation has characteristics of intentional transplantation of foreign technology under asymmetric power balance between 'donors' (outsiders) and 'recipients' (insiders) [22]. The outsiders tend to bring their past success models, while the insiders have less knowledge, technical and financial capability to propose alternative models even if they foresee challenges of applying the foreign models into their local context.

Furthermore, foreign knowledge and technology cannot be bought 'off-the-shelf' because improvement requires their internalization by local people. On this point, Kenichi Ohno stresses in his book, *Learning to Industrialize: From Given Growth to Policy-Aided Value Creation*, that '[w]hat is critically needed for latecomer countries is systematic and pragmatic learning of alternative international best practices for the purpose of enhancing the capacity to create their own policy packages' ([48], p. 54).

These underscore the need for developing countries to build an internal mechanism that continuously absorbs external knowledge and adapts to the local context, so that they can design and implement homegrown development strategies. We should

give more attention to how to develop the government's capacity for industrial policymaking, as well as private sector's response capacity, instead of using capacity constraints as an excuse for denying industrial policy. To this end, we have developed analytical frameworks by synthesizing Maegawa's theory of translative adaptation and Stiglitz's knowledge-centered development thinking toward an industrialized economy. We recommend translative adaptation—learning and modifying foreign models to create an enhanced local model—as an essential approach for latecomer countries to realize homegrown development.

1.2.1 Translative Adaptation and Local Learning

1.2.1.1 Translative Adaptation as Dynamic Interaction Between Foreign and Local Systems

Translative adaptation is the concept presented by Keiji Maegawa, Japanese economic anthropologist, referring to the process of systemic merger and the resultant dynamic interaction between a dominant foreign system and a local society [29, 30]. As cited below, it is about the adaptive acceptance of advanced systems and new culture by latecomer countries—often introduced from abroad through foreign aid and globalization—in the process of modernization. In this process, dynamic interaction between foreign and local systems takes place, where foreign elements can be reinterpreted and adjusted to the existing value structure and local institutions.

> [M]any nations and societies have adopted Western institutions and objects from without in order to survive (or by their own choice). However, it is important to recognize that they did not accept Western inventions in their original forms. Any item in one culture will change its meaning when transplanted to another culture, as seen widely in ethnography around the world. [...] The essence of what has been called 'modernization' is the adaptive acceptance of Western civilization under the persistent form of the existing culture. That is, actors in the existing system have adapted to the new system by reinterpreting each element of Western culture (i.e., 'civilization') in their own value structure, modifying yet maintaining the existing institutions. I shall call this 'translative adaptation.' (Maegawa [29] English translation, pp. 174–175; underlined by the author)

In the context of development, translative adaptation is the process where latecomer countries undertake global integration with national ownership, with proper selection of the model and management of the process. Maegawa argues that a latecomer society is not really weak or passive if it controls the type, terms, and speed of importation of foreign ideas and technology, using them to stimulate the existing society for new growth. Here, the government plays a critical role in assisting home society to embrace new things and evolve positively. But not all countries can do this. Translative adaptation requires policy skill, knowledge, and national effort under wise national leadership [48]. According to Maegawa, Meiji Japan was a country that succeeded brilliantly in translative adaptation (see Chap. 3). In postwar Japan, the private sector and government made collaborative efforts to form *Kaizen*, through

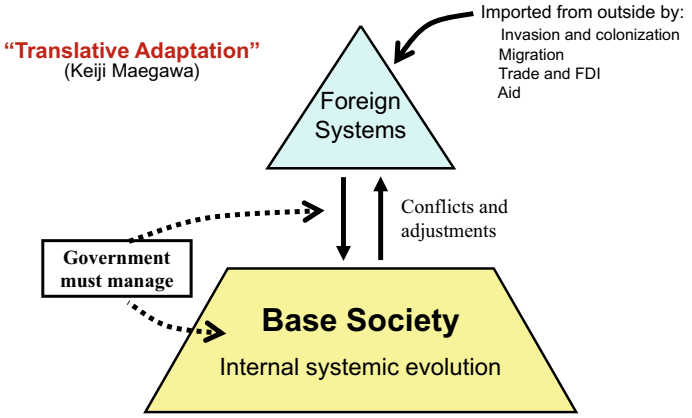

Fig. 1.1 Development process as systemic interaction (*Source* Adapted from Fig. 1.2 in Kenichi Ohno [46], p. 14)

local adaptation of management technologies brought from the United States (US) (see Chaps. 2 and 4). The perspective of Maegawa is illustrated in Fig. 1.1.

Shigeru Ishikawa, a Japanese development economist, shares a similar yet complementary perspective to Maegawa in his research without using the term 'translative.' Ishikawa stresses the importance of understanding the initial conditions within respective developing countries, including their stage of market development, and suggests the need to foster the will and capability within these countries to 'adapt' policy prescriptions advised by foreign donors to local reality [16]. He emphasizes the critical role of the government in this undertaking. As will be explained below, Ishikawa made important contributions in providing intellectual support to China and Vietnam for their transition to a market economy.

1.2.1.2 Importance of Local Learning

Maegawa's anthropological perspective also provides a good insight of the process of local learning as emphasized by Joseph Stiglitz. Stiglitz highlights the importance of knowledge in development. When he served as chief economist of the World Bank, he led the publication of *The World Development Report (WDR) 1998/99: Knowledge for Development* by putting knowledge at the core of development efforts [66]. Later, Stiglitz and Greenwald [58] published a book, *Creating a Learning Society*, which highlights the vital importance of promoting local learning in each arena of society—individuals, workers, managers, firms, governments, and other organizations—to realize economic and societal transformation. Key messages of this book include:

> A central focus of development policy should be closing that gap [a gap in knowledge]—and that means enhancing learning. This is, for instance, one of the central objectives of modern industrial policies and particular technologies with greater learning capabilities and greater spillovers to other sectors. (22)

> A critical aspect of "learning" is that it takes place locally and must adapt to local differences in culture and economic practice. Thus, "learning" prescriptions that work in some environments will not work in others. (375)

Through the lens of translative adaptation, local learning can be explained as a process of reconceptualizing the obtained knowledge through the value structure of recipient countries and society—which is indigenous learning practice. As such, local learning must be accompanied by translative adaptation, and this requires strong ownership of the recipient side over the process [22].

1.2.1.3 Three-Stage Process of Technology Transfer and Local Learning

Then, a key question is what are the conditions and mechanisms that enable a latecomer country to absorb foreign elements effectively without losing the local value structure, and how can the country in question learn appropriate methods and procedures for merging domestic and foreign elements. In this regard, Kikuchi [23] introduces a useful framework for understanding the process of technology transfer from advanced to developing countries. It involves a three-stage process of technology transfer, based on the Japanese postwar experience of learning production management technology (which later was called *Kaizen*) from the US and Europe and diffusing it after localization. These stages are: (i) learning new technology from advanced countries; (ii) examining the adaptability and validity of the introduced technology in Japan; and (iii) diffusing the technology at full-scale. Kim [25] also identifies three key sequences in the flow of technology from abroad to catch-up countries, based on the learning experiences of South Korea which achieved miraculous economic growth.[3]

While Kikuchi's framework focuses on the stages of learning specific technologies by the Japanese private-sector organizations (technology learning), it can be applied broadly to the local learning process including policy learning by developing country government. Figure 1.2 shows our modified three-stage framework for translative adaptation and effective local learning which incorporates elements of systemic interaction with external agents (such as donors), with special attention to the government's learning of industrial policymaking.

The figure illustrates the activities of local learning and translative adaptation as a process of using foreign knowledge (often, based on benchmarking countries' models) as 'input' and combined with indigenous knowledge of the home country to produce an enhanced local knowledge as 'output.' Adapted models (compared to foreign models) are built on enhanced local knowledge, giving attention to the uniqueness of each country and society. Through this process, learning capacity can

[3] Based on South Korean experience, Linsu Kim [25] regards government as a 'learning facilitator' (21). He notes three key sequences in the flow of technology from abroad to catching-up countries: (i) transfer of foreign technology, (ii) diffusion of imported technology, and (iii) indigenous R&D to assimilate and improve imported technology and to generate its own technology.

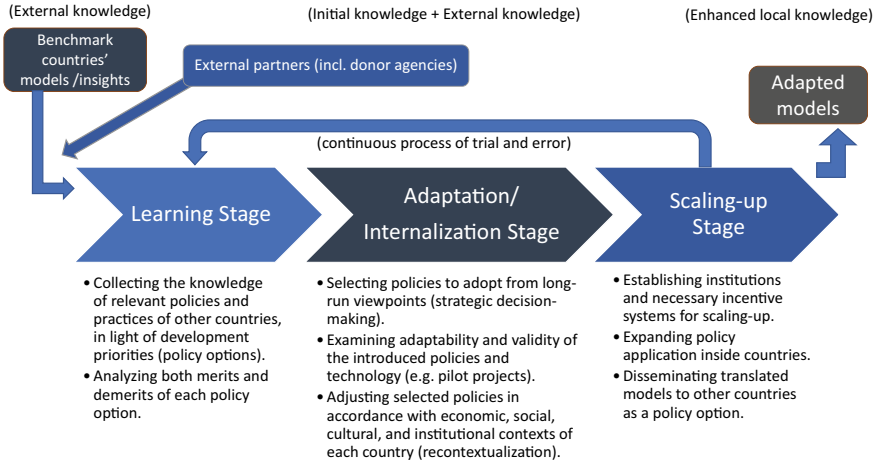

Fig. 1.2 The three-stage process of local learning and translative adaptation (an example of policy learning by government) (*Source* Adapted from Kikuchi [23], based on inputs from Junichi Mori and Akio Hosono)

be enhanced. The entire society (such as workers, managers, firms, government) is involved in local learning activities; but in light of centrality of industrial policy to learning, the government plays the dual role as a policy learner and a facilitator of societal learning (see Sect. 1.2.2).

Here, the government is expected to: (i) collect the information on relevant policies and practices from other countries and analyze the merits and demerits of each policy option (learning stage); (ii) select what policies to adopt, examine the adaptability of the introduced policies, and adapt them to its own country-context (adaptation/internalization stage); and (iii) expand policy application nationwide and if successful, even disseminate these experiences to other countries as a policy option (scaling-up stage).

International best practices—whether they are a technical and vocational education and training (TVET) system or a quality and productivity improvement approach—have little impact unless they are effectively put to use in the local context. The subsequent chapters include case studies of how such learning was initiated, how local adaptation took place, and whether and how development cooperation contributed to facilitating this process based on the above three-stage framework for local learning and translative adaptation.

1.2.1.4 Key Ingredients of Translative Adaptation and Effective Local Learning

As the above discussions suggest, translative adaptation does not naturally occur as a result of market mechanisms. To succeed, the process must be managed with careful deliberation and trial and error. Mindsets and institutions that facilitate a smooth systemic merger must be designed and installed. The government has a critical role to play in establishing the systemic aspect of learning—as a learner (policy learning) and a facilitator of learning by the private sector (societal learning including technology learning)—with a thorough understanding of each country's situation and surrounding external environment [51].

In this light, the key ingredients of translative adaptation and effective local learning can be summarized as follows:

- *Attention to the uniqueness of each country and society* by understanding country-specific circumstances (e.g., resource endowments, stages of development, social structure, and values), and envisioning and designing diverse paths to development;
- *Country ownership* that promotes the proactive role of government (policy learning) and private sector development (societal learning);
- *Process orientation with room for trial and error* to establish systems that properly correspond to the stages of learning, adaptation, and internalization, and scaling-up; and
- *Rethinking the role of development cooperation*, giving due consideration to the above three aspects to facilitate translative adaptation and effective learning of partner countries.

The first three points are those that developing countries must be mindful of, while the last is for donors who are urged to rethink their role in development cooperation. An important question is how to ensure effective translative adaptation in the development process instead of the mechanical application of technology from the outside of the society. We argue that 'both the recipients and providers of knowledge should be cognizant of the value of translative adaptation and pay significant attention to the value structure and institutions of the recipient side' ([22], p. 22). In this regard, the recipient side needs to play a proactive role in adaptation and the provider side needs to create an enabling environment for it.

Related to the fourth point, it is important that development cooperation be provided in such a way as to facilitate the learning process by recipient partners. Donors should duly recognize that '[t]here is no "best practice" that any country can adopt that will guarantee success' ([51], p. 3). They should have a deep understanding of uniqueness of respective partner countries and provide tailor-made advice in the process of knowledge and technology transfer. This goes beyond just sharing the best practice 'off-the-shelf' between donors and recipient countries. There is a need to establish the deeper intellectual partnerships through interactive dialogue.

1.2.2 Two Types of Local Learning: 'Policy Learning' and 'Societal Learning'

Two types of local learning are important for industrial catch-up [42]. One is 'policy learning' by the developing country government to design and implement effective industrial policies; and the other is 'societal learning' by whole members of society to absorb new knowledge and technology and catalyze their mindset changes toward modernization. The below explains both types of learning and how they are interrelated and mutually supportive.

1.2.2.1 The Role of Industrial Policy in Promoting Societal Learning

Industrial policies play a crucial role in promoting societal learning [58]. This is because the government is responsible for establishing the systemic aspect of societal learning as a 'learning facilitator,' not only a learner itself [25, 51]. Figure 1.3 shows the dual role of government in creating a learning society, from a perspective of translative adaptation and local learning. First, the government itself must be a good learner of industrial policymaking through translative adaptation. When the government of a latecomer country endeavors to establish an overall vision and strategic direction for industrialization and designs industry policy instruments, it inevitably experiences the process of acquiring knowledge and technology from foreign models. It is important that such process be accompanied by local learning with translative adaptation in respective countries. The second way is that the government is responsible for creating policies and institutions for effective societal learning so that translative adaptation takes place within the society, including technology learning by the private sector.

Ideally, a process of local learning should take place in both the public and private sectors. This is why policy and societal learning is needed. It is also important to note that in the context of industrial catch-up, the private sector plays a central role in technology transfer and societal learning. Government policies represent only one side of the mechanism behind industrial development [38]. This public–private partnership is essential because knowledge flows both ways and mutual learning is necessary. Nevertheless, the government's role is critical in supporting the learning of the private sector, especially in the early stage of development where private sector dynamism is weak. As the private sector grows, it will assume a greater role in public–private partnerships including the creation of indigenous and innovative knowledge.

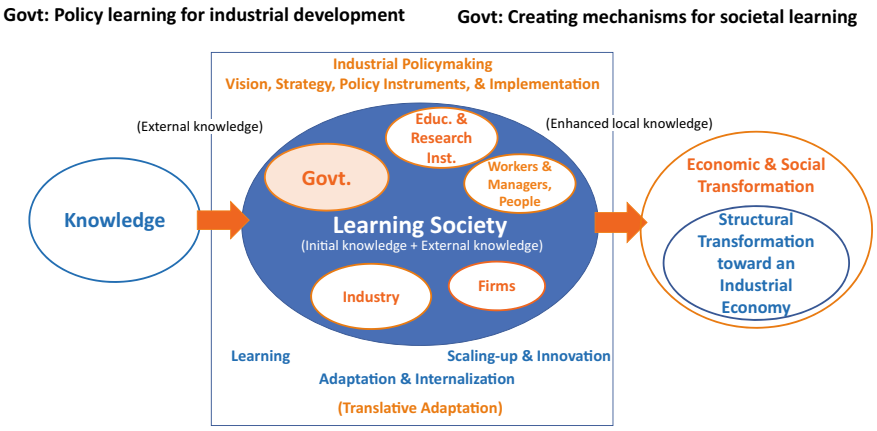

Fig. 1.3 Role of industrial policy in promoting societal learning [42] (*Source* Elaborated by the author, based on Fig. 11.1 in I. Ohno et al.)

1.2.2.2 Policy Learning

The above discussions suggest a positive aspect of government—as a solution provider in the industrial catch-up process. At the same time, we should recognize its weak aspect—the government as a problem [7]. The governments in many developing countries suffer from low capacity for policy design and implementation and face challenges to improve their policy capacity for industrial development. This was one of the major reasons why scholars and neoclassical economists, particularly in the 1980s-early 1990s, offered cautious assessments of industrial policy.[4]

However, the era of ideological controversies is coming to an end, and the nature of industrial policy debates has shifted to the practical aspects [41]. Many developing countries including Africa are increasingly interested in industrial development and even prioritized it in respective development strategies. For example, *The African Union Agenda 2063: The Africa We Want* (Agenda 2063) shows the continent's aspiration for becoming a prosperous Africa, based on inclusive growth and sustainable development [5], regarding economic transformation as one of the priority goals. The recent African Union (AU) Summit on Industrialization and Economic Diversification, held at the end of 2022, discussed action-oriented measures to accelerate Africa's industrialization, taking advantage of the commencement of trading under the African Continental Free Trade Area (AfCFTA) regime in January 2021. Now, the main question is how to improve the government's policy capability for its proper

[4] For example, Anne Krueger, a neoclassical economist known for her work on the political economy of the rent-seeking society [26], actively promoted liberalization and structural adjustment policies in developing countries as Chief Economist of the World Bank (1982–1986). She emphasized the risks that government intervention inevitably leads to rent-seeking behaviors by interest groups and generates high costs that inhibit the efficient functioning of market economies.

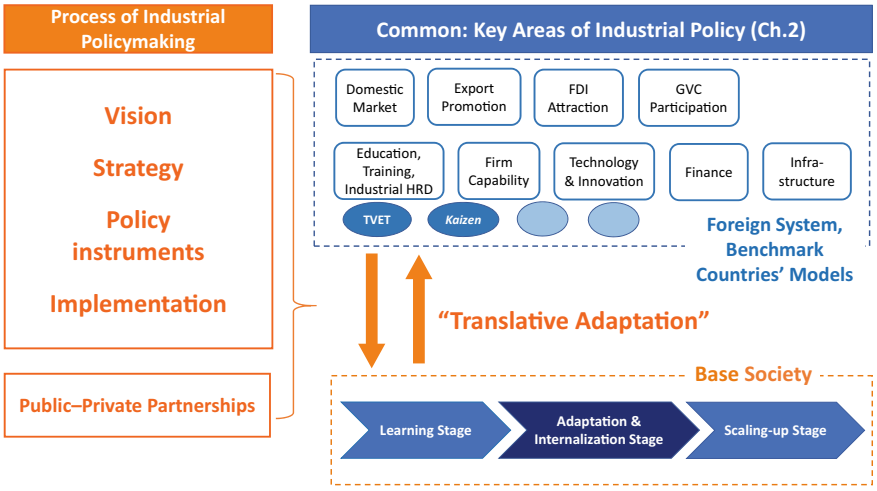

Fig. 1.4 Translative adaptation in industrial policymaking (*Source* Elaborated by the author)

application, and what instruments to select, rather than whether to engage in it [28, 41, 48, 54, 57].

Figure 1.4 shows key aspects of policy learning for industrial development from the lens of translative adaptation and local learning. Provided that industrialization is a national goal, the government is expected to assume three roles when designing and implementing industrial policies: (i) presenting overall vision and strategic direction of the country's industrialization; (ii) designing and implementing policy instruments; and (iii) establishing a proper process of industrial policy formulation and implementation, through close partnership with the private sector. The industrial vision determines strategic direction and priorities, and specific policy instruments are prepared and applied either horizontally across industrial sectors or vertically for selected sectors.

There is broad consensus on key components of industrial policy measures to be learned. Hosono classifies nine areas of industrial policy, based on extensive literature review (see Chap. 2). They include: (i) education, training, and industrial human resource development, (ii) firm capability, (iii) technology and innovation, (iv) finance, (v) infrastructure, (vi) domestic markets, (vii) export promotion, (viii) FDI attraction, and (ix) participation in global value chains (GVCs). Foreign experts and donors generally accept and recommend these areas as the menu of industrial policy measures for developing countries. In each area, relevant policy instruments can be designed (for example, TVET-industry linkage, quality and productivity improvement, industrial zone development and management). If applied across sectors, they can serve as horizontal industrial policies. If targeted at selected sectors or industries, they can function as vertical industrial policies.

Three points deserve attention. First, the learner side needs to make solid preparation by cataloguing relevant policy measures, setting benchmark countries, and

studying their particular models—mindful of what is common and what is unique to the country concerned. Although the menu of industrial policy measures is largely common, the local content varies. The details of policy design and organizational arrangements do matter. Such groundwork should serve as a valid starting point for formulating homegrown development policies.

Second, prioritization is important. For a latecomer government, any one of the measures in Fig. 1.4 is not easy to design and implement with local adaptation. Rather than trying to address all the industrial policy menu, it is advisable for the learner to start with a small number of measures that are relatively easy to adopt and at the same time relatively important for the country [48]. Furthermore, policy implementation needs to be monitored closely. In this light, the government should identify unique potential for each country and formulate a vision and strategic direction for industrialization, in close partnership with the private sector.

Third, the government needs to learn from the private sector, not just the foreign models of best practices. Because the private sector is the key actor of production, investment, and trade, it is important to listen to their voice and understand the concrete challenges they face. To be effective in setting industrialization vision, strategies, and specific policy instruments, the government must possess strong interest in the real economy, deep knowledge of the actual situation of industries, and mechanisms for communicating with the private sector. Public–private collaboration provides space for mutual learning and contributes to enhancing the quality of industrial policy. As such, policy learning should go hand in hand with societal learning as explained below.

1.2.2.3 Societal Learning

Development is not just a matter of technical adjustments, but a transformation of society [56]. This is because '[it] involves a movement from traditional relations, traditional ways of thinking, traditional ways of dealing with health and education, traditional methods of production, to more "modern" ways' ([56], p. 3). In this regard, Stiglitz refers to the Enlightenment which took place in Europe in the latter part of the eighteenth century and emphasizes that 'the most important part of the developmental transformation is the change in mindset that recognizes that change is possible and welcomes change' ([57], p. 33).

In fact, we often hear from FDI firms in developing countries that factory workers recruited from rural areas to industrial parks, lack 'soft' skills and a proper mindset, including industrial work discipline and motivation. They may acquire technical skills (e.g., cutting and sewing in the case of garment factories) relatively quickly; but poor work attitude in such forms as absenteeism, lack of sense of urgency for work, and low motivation to work overtime, are more challenging and affect firm productivity [53]. FDI firms may also face mindset problems of their local managers, including absence of sense of purpose and urgency, poor time management, lack of global mindset, and so on [53]. These suggest that transformation of the mindset of

workers and managers, as well as firm culture, is critically important in building an industrialized economy.

The importance of societal learning is also stressed by Akio Hosono in his recent book, *SDGs, Transformation, and Quality Growth*, which emphasizes that making growth 'genuinely' inclusive and innovative requires taking full advantage of the talents of the entire population. He states that '[i]f learning capacity is limited to a small part of the population of a country, inclusive growth is unlikely to be attained' ([13], p. 15).

Here, each arena of the society must learn—individuals, workers, managers, firms, governments, and other organizations—in the process of development [34, 58]. Put another way, according to Deepak ([34], p. x), learning can take place at three levels: micro, meso, and macro levels. At the micro-level, school education provides the base for nurturing the general capacity to learn, with TVET giving greater attention to learning specific or technical capacity. At the meso-level, capabilities of individual workers and managers, as well as those of firms must be built for managerial and technological upgrading. As such, 'learning at school' (micro-level) and 'learning at work' (meso-level) are complementary with the former designed to enhance the productivity of the latter [58]. At the macro-level, the government itself is a learner, and also assumes a strategic role in enhancing industrial and technological capabilities of various actors and institutions as discussed above. Moreover, it can play a catalyst role in society-wide change by undertaking projects that can lead to societal learning and promote mindset change ([56], p. 19). A good example is a national movement for quality and productivity improvement, implemented by the Singaporean government in the 1980s, which was inspired by Japan's postwar experience and aimed at transforming the popular mindset toward hard work, teamwork, and creativity [39, 43]. This may be analogous to the Enlightenment experience in Europe.

The subsequent chapters advance various ways to promote policy and societal learning. For example, several case studies highlight the role of *Kaizen*[5] in: (i) the development of human skills, especially non-cognitive skills of individual workers (Chap. 9); (ii) the creation of 'learning enterprises' by promoting organizational learning (Chap. 7); and (iii) the transformation of popular mindset toward quality and productivity through a national movement (Chap. 4).

In a separate book *Workers, Managers, Productivity: Kaizen in Developing Countries* [14], Hosono shed light on the learning dimension of *Kaizen*. With reference to the Japan International Cooperation Agency (JICA) [21], he emphasizes that the *Kaizen* process: (i) changes the mindsets of managers and workers; (ii) fosters

[5] *Kaizen* literally means 'improvement,' but is also commonly referred to as 'continuous improvement' (see Chap. 9 for the definition and evolution of *Kaizen*). It is a set of Japanese knowledge used to promote quality and productivity improvement based on an inclusive and participatory approach, involving the entire workforce from the top management to middle managers and workers. Masaaki Imai explains that *Kaizen* is an umbrella concept for a large number of Japanese business practices, such as 5S, suggestion system, Quality Control Circle (QCC), Total Quality Management (TQM), the Toyota Production System, the Just-in-Time System, the *Kanban* System, etc. Imai also argues that *Kaizen* is a unifying thread running through the philosophy, the systems and the problem-solving tools developed in Japan during the 1950–1980s ([15], p. xxxii).

personnel who can think and act themselves; and (iii) solves problems as a team, thereby promoting teamwork. In other words, *Kaizen* activity such as QCC (by front-line workers) and TQM (as organizational learning) can increase productivity through learning and contribute to creating a 'learning enterprise.' He also stresses that *Kaizen* differs from other approaches—especially those based on monetary incentives or sanctions—due to its distinctive focus on inclusive and participatory learning [12].

1.3 Revisiting Japanese Experiences of Industrial Development and Development Cooperation

The Meiji modernization and the post-World War II economic reconstruction are the two critical moments in the history of Japan's industrial catch-up. These are the periods when proactive and intensive learning took place—at both the government and the private sector—and the Japanese economy achieved major economic and social transformation. Meiji Japan did self-study because no foreign aid was available in those days. Postwar Japan utilized various channels, including ODA, to learn foreign knowledge and technologies for industrial catch-up.

There exists a rich literature on the history of Japanese economic development [33, 38, 49, 50]. Therefore, rather than a comprehensive review, this section will highlight selected episodes that characterize Japanese perspectives on industrial development and the development thinking that underpins Japan's industrial development cooperation. It will also discuss the diffusion of learning that has occurred in Asia, following Japan's learning from the West.

1.3.1 Japanese Perspectives on Industrial Development

The core elements of the Japanese approach to economic development include state capacity-building, the long-term perspective and goal orientation, and industry-specific real-sector concern. These concrete and practical principles were applied during Meiji modernization and rapid industrial catching-up after World War II when Japan was itself a latecomer developing country. As will be shown below, they are closely related to the key ingredients of translative adaptation and effective local learning, presented in Sect. 1.2.1.

1.3.1.1 Policy Learning and Societal Learning in Meiji Japan

When Japan opened its doors to the outside world in the nineteenth century, it was shocked by the level of industrialization in those countries that had gone through the Industrial Revolution. This was also the age of imperialism. Recognizing its

backwardness, the Meiji government aggressively promoted learning to industrialize, embracing the national slogan of enriching the country and strengthening the military.

The most famous example is the dispatch of the Iwakura Mission to the US and Europe during 1871–1873. Led by Tomomi Iwakura (a high-ranking official with rank of Prime Minister), more than 100 members including the Prime Minister, Ministers, officials, researchers, and students, participated. It was quite surprising that key cabinet ministers would be away for such a long overseas mission—shortly after the establishment of the Meiji government. Nevertheless, the Iwakura Mission provided a valuable opportunity to Meiji leaders to gain first-hand knowledge of industry, technology, and political systems of advanced countries from a comparative perspective and nurtured their passion for industrialization [4].

Upon returning to Japan, Meiji leaders vigorously promoted industrialization. In 1874, Toshimichi Okubo (1830–1878), the first home minister of the Meiji government who initiated an industrial modernization drive (see Chap. 3), submitted the Proposal for Industrialization to the government after the Iwakura Mission. In the proposal, Okubo emphasized the following points ([36], p. 561): The strength of a country depends on the prosperity of its people which, in turn, is based on the level of output. To increase output, industrialization is essential. However, no country has ever initiated the process of industrialization without official guidance and promotion. This statement shows Okubo's conviction of a critical role of the state in the early stage of industrialization.

The Meiji government took a phased approach and introduced foreign knowledge and technology through various measures sequentially, in overlapping steps. Kenichi Ohno, in his book *The History of Japanese Economic Development: Origins of Private Dynamism and Policy Competence*, explains that '[d]ifferent technological transfer schemes were adopted depending on project type and time periods, from simple turnkey projects contracts and management contracts to engineering education, selective technical advice, copy production based on reverse engineering and original invention after studying foreign models' ([49], p. 50). He also states that the most prominent aspect of Meiji Japan's technology absorption was progression from easy to complex in both content and method of technology learning as domestic capability steady rose. Hashimoto [9], based on his literature review of foreign advisors in Meiji Japan, explains how the government gathered a wide range of information and carefully prepared to find and invite the most suitable experts in each field from around the world. While the number of foreign advisors hired by the Meiji government exceeded 500 in 1875, the number—especially that of engineers—declined significantly toward the end of Meiji as Japanese engineers steadily replaced foreigners [49, 61]. It should be noted that behind this achievement, there were serious learning efforts through education. In 1871, the Meiji government established the Imperial College of Engineering (renamed as *Kōbu Daigakkō* in 1877) and subsequently, other high-level industry schools, to educate and produce domestic engineers.

In parallel, the Meiji government made the utmost effort to re-negotiate the unequal commercial treaties with the West, which were concluded in the late Edo (1858) period to restrict Japan's tariff rights. The restoration of tariff autonomy was important for the government in securing tax revenues as well as the policy space

for industrialization.[6] As such, the Meiji government was a serious learner, and also acted as a 'learning facilitator' in the Japanese society in acquiring knowledge from abroad and absorbing knowledge through training and education.

It is also worth noting the learning efforts by the private sector and its purposeful and pragmatic approach. A typical example is a success story of the Osaka Spinning Company, established in 1883 by Eiichi Shibusawa (1840–1931), a super business coordinator and former official of the Ministry of Finance [44].[7] To cope with surging imports of cotton yarn as the result of opening trade with the West, the government set a target for substituting import of cotton yarn with domestic production but had limited progress. Recognizing the problems of existing state-owned cotton spinning mills (such as small production scale, location, lack of technical expertise), Shibusawa decided to set up a new spinning factory with modern machines and worked hard to mobilize the necessary funding. In addition, he persuaded Takeo Yamanobe, a young engineer studying in the United Kingdom (UK) at the time, to acquire the latest knowledge and technology of the cotton industry, and financially supported his study. Upon return, Yamanobe became the chief engineer of the Osaka Spinning Company, and led it into instant success by using his deep practical knowledge. This had a powerful demonstration effect, and a large number of spinning factories followed. By early twentieth century, Japan had become the top textile exporter ([49], see also Chap. 3). This story tells how the government and the private sector worked hard to achieve a shared national goal, maximizing their learning outcomes. It also shows the importance of a pragmatic approach with specific targets and concrete thinking.

1.3.1.2 Goal Orientation and Real Sector Concern in Postwar Japan

Long-term perspective and goal orientation, and industry-specific real sector concern are key features of Japanese approach to economic development. While these are salient in Meiji Japan's industrialization drive as mentioned above, let us provide more examples from the postwar economic recovery and high-growth eras.

The post-World War II period through the mid-1950s was a time when Japan focused its efforts on economic reconstruction of the war-torn economy [63]. Industrial policy during this period aimed at rebuilding basic industries to revive the Japanese economy. The following two initiatives formed the backbone of this effort.

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[6] Tariff rights were partially regained in 1899 and completely restored in 1911, as Japanese modernization and industrialization proceeded, and its success came to be recognized by Western countries.

[7] Eiichi Shibusawa is often called as the Father of Japanese capitalism. He established over 500 companies, numerous economic institutions such as the stock exchange and the chamber of commerce, and non-economic institutions such as hospitals and universities. It is interesting to note that Shibusawa mobilized capital, technology, and human resources for setting up companies but never assumed general directorship. He delegated the running of the company to others. Shibusawa did not form his own *zaibatsu* (large industrial and financial conglomerates), unlike Yataro Iwasaki who founded the Mitsubishi zaibatsu.

First, *The Basic Problems of Japan's Economic Reconstruction* (hereinafter, the 'Basic Problems' report) [31],[8] compiled by the Special Survey Committee of the Ministry of Foreign Affairs consisting of prominent researchers and officials and coordinated by Saburo Okita, was a monumental work which outlined Japan's postwar reconstruction plan [55]. The 'Basic Problems' report made systematic assessment of the initial conditions of the Japanese economy and established concrete and realistic targets. It prioritized heavy and chemical industries as the key to postwar economic recovery, while keeping an outward orientation by promoting export of industrial products through participation in the international division of labor. The report supports the positive role of government in presenting long-term visions and strategies for development and coordinating the actions of the private sector.

Second, 'the Priority Production System'—proposed by the Coal Subcommittee, a private advisory group of Prime Minister Shigeru Yoshida, chaired by Professor Hiromi Arisawa of the University of Tokyo—embodied a focused approach to enhancing available resources. At that time, coal was the only domestical energy source produced in adequate amounts in Japan [20]. The Priority Production System, adopted in December 1946, channeled remaining scarce resources into a few priority industries (i.e., coal, iron, and steel), using them as a catalyst to kick-start the industrial sector and to rebuild the national economy as a whole. This plan was quite successful, and the Japanese economy began to recover as early as 1947.

The central figure in these efforts was Saburo Okita (1914–1993). He is known as the architect of Japan's postwar economic reconstruction program as a planner and economist [41]. Immediately after World War II, Okita was associated with the Ministry of Foreign Affairs Research Bureau, then worked at the Economic Stabilization Board. From 1954 to 1960, he was at the Economic Planning Agency (EPA), responsible for the first to fifth White Papers on the Japanese Economy. Here, we can find his development thinking. Long-term goals must be set for Japan's recovery and global industrial repositioning. Concrete real-sector strategies must be created to attain these goals, sector by sector.

Later, Okita served as the President of the Overseas Economic Cooperation Fund (OECF 1973–1977) and then Minister of Foreign Affairs (1978–1980) when he became closely engaged in North–South relations. After retiring from his official positions, Okita further expanded his scope of advice to and policy dialogues with developing countries to share Japanese experiences of economic development. This includes economic policy advice to China in the late 1970s (Sect. 1.3.3), and Argentina (the so-called 'Okita Report') in the mid-1980s, which is widely regarded as a pioneer work in Japan's intellectual cooperation with developing countries (see Chap. 5).

[8] Toward the end of the war, young engineers including Saburo Okita and Yonosuke Goto knew that Japan would lose and decided to organize study meetings to discuss post-war recovery strategies. The first meeting took place on August 16, 1945—one day after Japan's defeat. They met every week with the attendance of prominent officials and academics, with Okita and Goto serving as the secretariat. The study group was later officially recognized as MOFA's Special Survey Committee.

Following the postwar recovery period, industrial policies during mid-1950s to the early 1970s aimed at modernizing and strengthening the international competitiveness of various industries (e.g., textile, light machinery industries) and developing export-oriented industries. Competing effectively with Western multinationals was another important goal as trade barriers were lifted under the GATT Kennedy Round commitments. In 1960, Prime Minister Hayato Ikeda adopted the Income Doubling Plan, which set the goal of doubling national income within a decade. The Ministry of International Trade and Industry (MITI) enacted regulations such as the Act on Temporary Measures for the Promotion of the Machinery Industry and the Small and Medium-sized Enterprise Modernization Promotion Act and promoted the introduction of foreign new technologies in preparation for trade liberalization [63]. MITI together with the Japan Development Bank coordinated and assisted private efforts in improving productivity (see Chap. 2). Various productivity tools such as the 5S technique[9] and quality control circles (QCC), which are collectively called *Kaizen*, were developed by learning from US methods and adapting them to the Japanese context. The private sector took the initiative of organizing *Kaizen* national movements based on collaboration among industry, government, and labor unions (see Chap. 4).

Masatake Wada, who himself was a MITI official at that time, recalls that MITI and businesses shared the same awareness and future visions. MITI officials communicated closely with the private sector to understand different intentions and problems of individual firms, and then formulated industrial policies [63]. In a sense, industrial policy was a joint work between MITI and business circles, and both sides benefitted from mutual learning.

As these examples show, industrial policy has taken a goal-targeting form, with deep interest in the real economic situation. It also tries to build on unique potentials Japan had at that time. Concrete action plans were prepared to realize such growth potentials that may designate specific industries or areas to be developed, or a time-bound plan to build human capital, power, transport, and telecommunication networks that are needed to develop them ([40], p. 156). Limited resources were poured into this area to realize that potential rather than scattered across many unrelated programs.

[9] The 5S technique, consisting of Seiri, Seiton, Seiso, Seiketsu, and Shitsuke, is a very Japanese method for improving quality and productivity on the factory floor. These five slogans can be variously translated. One example is Sort, Set in Order, Shine, Standardize, and Sustain, which maintains the initial letter of S but deviates from the Japanese meaning.

1.3.2 The Japanese Approach to Industrial Development Cooperation

The above perspectives, nurtured through its own catching-up process, have been strongly reflected in Japan's philosophy and approach to industrial development cooperation. These can be summarized as follows [41, 44].

1.3.2.1 Focus on 'Growth Ingredients' and Field-Orientation with Hands-On Support

A key feature of Japanese approach to industrial development is its real sector concern, where project details and concrete methods matter. Japanese development cooperation exhibits a profound interest in individual sectors and concrete projects at *gemba*—a place where real action takes place such as factories and crop fields. JICA, an executing agency of Japanese bilateral ODA, declares *gemba*—'Dive into the field and work together with the people'—as a priority action of the organization.[10] Many JICA documents and ODA evaluation reports discuss the importance of *gemba*-orientation and looking at the real issues, and how they have contributed to building trusts with partners in developing countries.

More specifically, Japanese development cooperation pays greater attention to 'growth ingredients' such as the abilities and problems of individual firms in the private sector, the structure of an economy, as well as human, technological, production, and logistical details, in the concrete context of target sectors and regions. Training factory workers for *Kaizen*, laying out capital equipment efficiently, and matching crop species with particular soil are among things that are seriously discussed [40, 44]. In practice, this approach is embodied as hands-on support working side-by-side with developing country counterparts. By contrast, Western donors tend to focus on policy and institutional frameworks, such as market functions, principles of government intervention and budgets and public investment, monitoring and evaluation, administrative efficiency, and accountability.

For example, Kikuchi [24], a JICA expert, compares Japanese and European Union (EU) approaches in quality and productivity improvement projects in Tunisia and notes that: (i) the EU project assists Tunisian firms to acquire ISO certification, aiming to transfer internationally uniform standards applicable for all companies (e.g., business management, document preparation); and (ii) the JICA project (*Kaizen*) envisages improvement of quality and productivity on the factory floor, adopting different techniques and approaches for different problems encountered by individual companies. The Ease of Doing Business Indicators and the Worldwide Governance Indicators, developed by the World Bank[11] are another examples.

[10] See JICA homepage which explains its vision, mission, and action: https://www.jica.go.jp/english/about/mission/index.html#intro.

[11] See the World Bank's websites, https://www.doingbusiness.org/en/doingbusiness; https://info.worldbank.org/governance/wgi/.

They emphasize overall fairness, the improvement of the business climate, and good governance. Indicators are set by extracting desirable attributes of the international best practices, and countries are ranked against these global norms so that they know where they stand [40, 45].

In this regard, Toru Yanagihara makes an interesting comparison between the Japanese and Western approaches to economic development [67]. According to him, there are two contrasting ways of understanding and analyzing economic development. One focuses on the 'framework' of an economic system and its management and the other focuses on an economy as the sum total of its 'ingredients' or component parts. The 'framework' represents the rules of the game according to which economic agents make decisions and take action in a given economy. In contrast, the 'ingredients' approach refers to tangible organizational units such as firms, official bureaus, and industrial projects and their aggregations such as industries, sectors, and regions. The ingredients approach conceives of the economy as a collection of these components. It takes a deep interest in how individual players are doing in the field and the outcome of each game.

Let us think about a football game. To realize a fair game, clearly defined rules and referees facilitating a level-playing field must be put in place. At the same time, individual players must be coached in a tailor-made way so as to maximize their talents. The two approaches are complementary.

Nonaka and Takeuchi [37] present another interesting comparative perspective by introducing the two concepts: 'explicit knowledge' and 'tacit knowledge.' Explicit knowledge is oriented toward a context-free theory, while 'tacit knowledge' is created in a specific, practical context. One could say that the international best practice or normative approach provides context-free 'explicit knowledge,' while the hands-on approach emphasizes sharing context-specific 'tacit knowledge' with counterparts through joint work and interactive communications on the ground. Nonaka and Takeuchi [37] also state that the 'tacit knowledge' is related to the type of knowledge unique to Japan and the East.

There is one thing to keep in mind. In the above, we have contrasted the Japanese and Western approaches, but this is simply a matter of emphasis. In fact, they have much in common. Furthermore, both approaches are necessary and mutually reinforcing. Nevertheless, as a general tendency, it is fair to say that the 'framework' approach is prevalent in Western donors, while the 'ingredients' approach is more common in Japan and East Asia ([40], p. 146).

1.3.2.2 Dynamic Capacity Development

Focus on growth ingredients, field (*gemba*)-orientation, and the 'hands-on' approach are inter-related features of Japanese industrial development cooperation. We argue that this approach supports *dynamic capacity development* of partner countries by facilitating the process of learning and translative adaptation, and thus enhancing the government's policy capacity [44]. Dynamic capacity development aims to achieve concrete objectives through step-by-step, hands-on-efforts, and learning by doing

[44]. Capacity is created where it is needed through solving real, concrete problems one by one.

Field-orientation and joint work provide ample opportunities for government leaders and policy makers to interact and formulate policies over an extended period. Backed by the knowledge of country-specific contexts from ground perspectives, these help to establish concrete goals that are both desirable and feasible for each country. Instead of comparing countries across the board to rank them or finding weaknesses in individual countries relative to global norms, the dynamic capacity development approach tries to identify possible future paths unique to each country. Concrete action plans are prepared to realize such growth potentials that may designate specific industries or areas to be developed, or a time-bound plan to build human capital, power, transport, and telecommunication networks that are needed to develop them ([40], p. 156).

Nevertheless, we should also recognize its constraints. A great advantage of the provision of context-free 'explicit knowledge' is that it is easier and quicker to learn standardized solutions or best practices 'off-the-shelf.' This approach may be more fitting to the age of digitalization, where knowledge can be disseminated instantaneously. The dynamic capacity development approach demands much patience and persistence from counterparts because they are encouraged to find their own tailor-made solutions through joint work with foreign experts. Learning tacit knowledge from foreigners usually takes more time compared to learning well-documented explicit knowledge. Moreover, foreign donors must be equally patient. If donor agencies demand only quick results, foreign experts and consultants may not be motivated to adopt this approach. Another prerequisite is strong policy ownership. If counterparts are not willing to go through intensive policy learning processes, this approach will fail.

The experience of COVID-19 crisis has taught us the strengths and weaknesses of each approach. Technological advances have made it possible to easily acquire large amounts of basic and standardized knowledge through digital platforms. At the same time, there is a growing realization that learning 'in person' is of irreplaceable value, especially when personalized learning is required. Rather than choosing one or the other, it is important to find the best mix by considering the advantages and disadvantages of each. In this respect, the Japanese approach could certainly contribute to the latter.

1.3.3 Regional Diffusion of Learning in East Asia[12]

East Asia is the region where a chain reaction of learning for industrial catch-up has taken place—in both the public and private sectors. According to Alexander Gershenkron's well-known proposition of the 'advantage of backwardness,' latecomers can achieve industrialization faster than advanced countries by leveraging the existing technologies developed by early comers [8, 27]. But such latecomer advantage does not realize automatically, the transferred technology and knowledge must be internalized to take root in recipient countries and societies so that they can provide the basis for creating localized, new knowledge [1, 38, 59].

In this regard, East Asia is notable because industrial catch-up has occurred not only by latecomer advantage, but also by regional diffusion of learning [32]. East Asia had role models of developmental success, starting with Japan and followed by such newly industrialized economies as Taiwan, Singapore, Hong Kong, and South Korea in the 1970s. Japan was the first non-Western country to open its country in the second half of the nineteenth century (from the late Edo to the Meiji periods) to learn Western knowledge and modernize by adapting this to its own way with strong ownership. This is exactly the process of 'translative adaptation' [29, 30]. After World War II during the Allied occupation from 1945 to 1953 and throughout the Cold War, Japan greatly benefitted from learning opportunities provided by the US through technical advice and assistance [62]. The Quality Control and Productivity Movements, initiated respectively by the Union of Japanese Scientists and Engineers (JUSE) and the Japan Productivity Center (JPC), were typical examples of learning and translative adaptation of American methods [43], also (see Chap. 4). More generally, the Japanese government, private companies, and organizations including the Ministry of International Trade and Industry (MITI) actively introduced knowledge and technology from overseas in this economic reconstruction and high-growth era [63].

The combination of US aid and Japanese catch-up experiences stimulated developmental leaders in neighboring countries, and reginal diffusion of learning for industrialization took place in East Asia [62, 69]. Ezra Vogel [62], in *The Four Little Dragons*, highlighted the spread of industrialization in Taiwan, South Korea, Hong Kong, and Singapore as follows[13]:

> East Asian nations received massive aid from the United States and from international organizations, which gave them extensive opportunities for contact with knowledgeable foreigners. These were overwhelmingly Americans, who became in effect tutors, not only in modern technology and management, but in the broader aspects of industrial society. Because American advisors could provide East Asians with appropriate advice and training of greater depth than any textbook could transmit, they were perhaps even more crucial than the financial, military, and technical aid. ([62], p. 85)

[12] The author is grateful for the support of Kanako Omi and Kae Yoshino in the extensive literature review of country experiences.

[13] Vogel noted American aid and the Japanese model as two of the five key situational advantages for their rapid industrialization. The other three include: destruction of the old order, sense of political and economic urgency, and eager and plentiful labor force.

> After World War II, the Japanese model was of great importance to Taiwan, South Korea, Hong Kong, and Singapore. […] Having the Japanese model provided both the confidence that they too could succeed and a perspective on how to proceed. ([62], pp. 90–91)

The importance of role models for industrial catch-up is also stressed by Yeo et al., Singaporean experts:

> Regions need countries with a developmental success story to serve as role models for their neighbors. At the turn of the twentieth century in East Asia, Japan was such a role model. […] [A]fter the Second World War, neighboring economies like South Korea, Taiwan, and Singapore acquired ideas and technologies, as well as a psychological boost, from Japan, enabling them to achieve developed status. ([69], pp. 173–174)

The effects of regional contagion were also highlighted by Stiglitz and Greenwald:

> It is no accident that Japan's neighbors were the first to learn how to learn—they observed, and imitated, what Japan had done. This knowledge of learning how to learn then diffused around Asia. ([58], p. 66)

China, which became the second-largest economy after the US, surpassing Japan in 2010, is no exception. In 1978, the senior vice-premier of the People's Republic of China Deng Xiaoping encouraged the country's leaders to make study trips abroad, and with 13 leaders believed to have made 20 trips to foreign countries both in Europe and Asia, 1978 was later named 'the year of foreign travel' [27]. Deng Xiaoping himself visited Japan (October) and Singapore (November) in 1978.[14] He was strongly impressed by their technology advancement and high standard of living; he also recognized China's backwardness and need to introduce foreign technology and capital. Shortly after his visits to Japan and Singapore, the Communist Party launched the 'open door' policy in late 1978.

Recognizing the importance of experimentation in their massive economic reform agenda, in July 1979, the Chinese government decided to let both Guangdong and Fujian provinces move ahead of others to set up export-processing zones in four cities (Shenzhen, Zhuhai, Shantou, and Xiamen), granting them the title of Special Economic Zone (SEZs) and a certain degree of autonomy by delegating powers to their city governments to attract FDI and generate exports [27].

In this connection, Saburo Okita was one of the first foreign experts who advised top leaders in the Chinese Communist Party, including Deng Xiaoping, when the 'open door' policy was launched in late 1978 [18, 70]. At the request of Deputy Prime Minister Gu Mu, Okita visited Beijing from the end of January to early February 1979, gave lectures on the factors contributing to Japan's rapid growth, and exchanged views on the challenges of China's economic development. Okita presented the Japanese

[14] During his visit to Japan, Deng Xiaoping met with Prime Minister Takeo Fukuda, attended the signing ceremony of the Sino-Japan Friendship Treaty, and visited Japanese companies such as Nippon Steel, Nissan, and Panasonic. He also took a ride on Shinkansen (high-speed bullet train) and stated: 'This is the speed we are looking for' and 'I now understand what is about modernization.' See the homepage of the Ministry of Foreign Affairs (in Japanese): https://www.mofa.go.jp/mofaj/a_o/c_m1/cn/page6_000210.html. In Singapore, Deng met with Prime Minister Lee Kuan Yew and was shown the country's Housing Development Board and the Jurong Town Corporation [69].

development model as one that is based on the Western model but with the addition of a stronger role of government in economic planning. He also suggested the idea of special economic zones, with reference to Nagasaki's Dejima, the Dutch enclave of foreign trade in otherwise internationally isolated Japan in the Edo period, and Thailand's special economic zones [18, 70].

The Chinese government was also active in promoting learning by higher educational institutions. It utilized the channel of multilateral cooperation to obtain knowledge and expertise from diverse sources. More specifically, the Chinese government requested the World Bank to support the capacity development of universities in education and research so that major universities could train the young generation of people with knowledge, skills, and mindset suitable to realize the goals of the 'Four Modernizations' set forth by Deng Xiaoping in the late 1970s.[15] The World Bank extended a series of loans, including the first Chinese University Development Project (CUDP I: 1982–1985) which focused on science and technology faculty and the second Chinese University Development Project (CUDP II: 1985–1990) which supported the revitalization of engineering and economics/finance faculties. According to Shigeru Ishikawa who served as the Vice Chairman of Economics and Finance of the International Advisory Panel of CUDP II, the project invited senior professors from various countries such as the US, Japan, West Germany, Australia, Canada, and the UK to receive advice on the curriculum development and design core courses at major universities [17]. The Chinese side was eager to learn. Although CUDP I was the first Bank operation in China, 'in almost every respect, project outcomes have surpassed appraisal expectations' ([64], p. vi). The World Bank's document also states that '[a] political consensus existed in China in 1985/86 at the start of the project [CUDP II]' and that 'this consensus existed in all sectors of the economy and throughout the government and facilitated the rapid development of the curriculum' ([65], p. 12). This is a good example of the government's facilitating societal learning through strengthening educational institutions.

In Southeast Asia, Malaysian Prime Minister Mahathir launched the 'Look East' policy in 1981 to improve Malaysia's human resource development by learning not only academic and technical knowledge but also the labor ethics and discipline of the Japanese people. Since 1982, a series of large-scale programs has been implemented to send Malaysian students and trainees to Japanese universities, industries, and training institutes through various funding schemes. This initiative continues today under the framework of the Look East Policy 2.0.[16] Singaporean Prime Minister Lee Kuan Yew initiated the nationwide productivity movement in 1981 to overcome the mindset problems and poor ethics of Singaporean workers and requested the Japanese government to transfer its expertise in quality and productivity improvement. JICA ran its first comprehensive technical cooperation project in Singapore

[15] The 'Four Modernizations' was set forth by Deng Xiaoping at the end of the Cultural Revolution in 1976, to upgrade the Chinese economy, particularly in the areas of agriculture, industry, defense, and science and technology.

[16] See the website of 'The Malaysian Look East Policy' created by the Embassy of Japan in Malaysia. https://www.my.emb-japan.go.jp/English/JIS/education/LEP.htm.

between 1983 and 1990. While Singapore learned from Japan, the country established its own institutional mechanism for productivity movement. This productivity campaign was promoted not only in the business world (which was the original Japanese model), but also in the public sector, linked with a civil service reform program (see Chap. 4). Based on this experience, Singapore came to offer technical cooperation for productivity improvement in developing countries, including the neighboring Association of South-East Asian Nations (ASEAN) countries and some African countries.

Certainly, the above-mentioned East Asian economies studied diverse models for development—not just the Japanese one. A key point here is that national leaders, policymakers, and the private sector (including firms, managers, and workers) were eager to learn for industrial catch-up. They made serious policy and societal efforts to internalize foreign models suitable to country-specific situations. These examples show the nature of learning in East Asia—the regional diffusion of local learning and translative adaptation—to promote homegrown development and industrial catch-up. They also highlight the importance of political leadership in initiating national learning efforts.

1.4 Approach, Structure, and Main Themes of This Book

1.4.1 Case Study Approach

This book adopts a case studies approach to analyze country-specific experiences of proactive policy and societal learning, from the lens of translative adaptation. The successive chapters contain many real cases from Japan and the other countries in Asia, Latin America, and Africa, focusing on the following research questions:

- How can foreign models of economic development be effectively learned by and applied to today's latecomer countries?
- How can such learning be initiated by the governments and societies with different features?
- Whether and to what extent have translative adaptation and local learning taken place? and what are key factors affecting the results?
- What is the role of the government in the translative adaptation and local learning processes?
- What is the role of development cooperation in facilitating the learning process?
- How should (or should not) this learning method be revised in the age of SDGs and digitalization?

The case studies cover the process and key areas of industrial policymaking shown in Fig. 1.4: (i) industrial policy (overall and specific sectors), (ii) quality and productivity improvement (*Kaizen*), and (iii) education and training for skill development. The analyses pay close attention to the perspectives presented in Figs. 1.2 and 1.3

and the 'key ingredients of translative adaptation and effective local learning' process mentioned earlier. Most of the cases are drawn from actual programs and projects of Japanese industrial development cooperation. We consider that such concrete analyses of real cases—rather than the studies on general theories and policy framework—are highly useful for national leaders and practitioners in developing countries to deepen their understanding of the pragmatic 'how' aspects of learning for catch-up.

1.4.2 Structure of This Book and Main Themes to Be Addressed

Table 1.1 shows the structure of the book and the relationship between chapters and its main themes. The subsequent chapters will present the various patterns of local learning initiated and promoted by different actors in the process of industrial catch-up. These actors range from national leaders, government institutions (e.g., counterparts, R&D organizations, TVET schools), the private sector (e.g., business leaders, firms, NPOs, universities), to individuals (e.g., workers and managers of firms). We also show how these initiatives have been developed into homegrown mechanisms and systems that support industrial development, giving attention to two types of learning—policy learning and societal learning.

More specifically, the book is composed of three parts with the following contents.

1.4.2.1 Translative Adaptation in the Industrialization Process

Part I (Chaps. 1–2) provides an overview of translative adaptation in the industrialization process and the role of industrial policies in learning, innovation, and transformation.

Following this introductory chapter, Chap. 2 reviews the typology and essential aspects of industrial policies, and examines the role of industrial policies in learning, innovation, and transformation, based on five country cases—Japan, South Korea, Malaysia, Brazil, and Chile—with special reference to steel, automotive, and natural-resources-based industries (palm oil, grain and food value chain, forestry products, and salmon industry). Three findings are worth noting. First, the governments of case studies countries have adopted diverse strategies for industrial development. Second, in all cases, industrial policies have been extensively implemented—both vertical and horizontal instruments—and contributed to their structural transformation. This suggests the importance of properly combining industrial policy instruments, under sector-specific characteristics and challenges. Third, in the process of development of the above transformative industries, many indigenous adaptation and innovation initiatives have been carried out. The public–private collaboration, through partnerships between the government, firms, their associations, research institutions, and

Table 1.1 Relationship between chapters and main themes of this book

Themes of chapters	Key areas	Local learning initiatives
Ch.1: Introducing foreign models for development (overview)	Key concepts, analytical frameworks, Japanese perspectives	Govt. & various actors
Ch.2: Industrial policies for learning, innovation & transformation (Japan, South Korea, Malaysia, Brazil, & Chile)	Industrial policy	Govt. & various actors
Ch.3: State learning in the Meiji period (Japan)	Industrial policy	Govt. (esp. national leaders)
Ch.4: National movements for quality & productivity improvement (Japan & Singapore)	Quality & productivity improvement	Private sector (Japan: NPO) & Govt. (Singapore: counterpart organizations)
Ch.5: Bilateral policy dialogue (Argentina, Vietnam, Ethiopia, & Thailand)	Industrial policy	Govt. (esp. national leaders & key policy makers)
Ch.6: Industry engagement in TVET (Vietnam)	Education & training	TVET university (public sector)
Ch.7: *Kaizen* promotion in Africa (Tunisia & Ethiopia)	Quality & productivity improvement	Govt. (esp. counterpart organizations)
Ch. 8: Industrial technology promotion & *monodzukuri* education (Thailand)	Education & training, and quality & productivity improvement	TVET university & NPO (private sector)
Ch.9: *Kaizen* and non-cognitive skills development in Africa	Quality & productivity improvement	Individuals (esp. workers, managers)
Ch.10 New industrial landscape	Industrial policy	Govt. & various actors

Source The author

other stakeholders, has been essential in learning, adaptation, and innovation. As such, industrial policies in the case studies have contributed to enhancing the societal capacity for learning.

1.4.2.2 Case Studies from Japan, Asia, Latin America, and Africa

Part II (Chaps. 3–8) offers concrete case studies of translative adaptation and local learning in the industrialization process.

Chapter 3 analyzes Japan's state learning in the Meiji period from the perspective of industrialization vision and draws implications for today's developing countries. The chapter gives special attention to the learning process of state leaders and the Ministry of Industry in the early years of industrialization, in particular, how the

divergence between the reality of the industrial sector and the direction of industrialization vision narrowed in stages. To this end, it traces the evolution of the Meiji government's industrialization vision, narrowing the gap, and internal and external factors which contributed to this narrowing. The chapter emphasizes the importance of state leaders' seriousness in industrialization, their efforts to accumulate industrial knowledge within the government and understand the reality of industrial entrepreneurs, decision making based on economic rationality, and the presence of the private sector with vitality. The learning experience of Meiji Japan underscores the relevance and importance of dynamic capacity development approach, which focuses on real sector and step-by-step learning through concrete examples.

Chapter 4 focuses on the experience of Japan and Singapore, which successfully learned management technologies for quality and productivity improvement from abroad, with local adaptation, and organized national movements for their diffusion. Japan introduced productivity and quality control methods from the US in the early post-World War II era, and quickly assimilated and developed these as its own management practice (*Kaizen*). Singapore was the first country to receive Japan's comprehensive technical cooperation (1983–1990) in this field, and successfully internalized and institutionalized the Productivity Movement. Nevertheless, the two countries adopted different approaches. In Japan, the private sector took the initiative to create the core organizations responsible for promoting a national movement for quality and productivity improvement, while the Singaporean Productivity Movement was led by the government. This chapter also analyzes the key factors for their successes and draws implications for today's developing countries. The experience of Japan and Singapore suggests that national movements, if properly designed and implemented, are an effective way to promote societal learning and transform the popular mindset toward industrial society.

Chapter 5 shows how Japan cooperates in industrial promotion with developing countries seriously interested in policy learning and knowledge acquisition. Japan conducts bilateral industrial policy dialogue with the governments of developing countries on an ad hoc and request basis. Its concrete and practical features are derived from Japan's past development experience. Developing countries often seek Japanese advice when a new policy direction is needed against the background of domestic policy competition or pressure from international organizations. The four cases of Japan's policy dialogue are presented from Argentina (the Okita Report), Vietnam (the Ishikawa Project), Ethiopia (GRIPS-JICA), and Thailand (the Mizutani Plan). They collectively exemplify the common Japanese approach as well as flexible adjustment of dialogue content and modality for each country. The concept of translative adaptation is stressed in which the learning government consciously modifies the foreign model to fit the local reality. The ingredients of successful bilateral policy dialogue include the strong commitment of the top national leader, country ownership, mutual respect and trust, and concrete actions and cooperation projects to realize proposed ideas.

Chapter 6 examines the development of the industry engagement system in Vietnam through a case study of the Hanoi University of Industry (HaUI). There is a world-wide consensus on the importance of industry engagement in TVET, and

'best practice' models are globally promoted. But there remains a question about how to build and institutionalize a workable system suitable to each country. This chapter analyzes how HaUI learned and adopted foreign models with localization. After studying various foreign models related to industry engagement, HaUI selected the Japanese training process management system, considering its capacities and the extent of support from industry. However, as translative adaptation is a dynamic process, it is predicted that HaUI will keep transforming the current model. The chapter finds three factors that enabled HaUI to undertake translative adaptation of the Japanese model: confidence building, capacity development, and strong ownership of those involved. It also discusses challenges of scaling up the HaUI experience to the national level, in part due to the insufficient involvement of government at the learning and adaptation stage.

Chapter 7 compares the 10-year achievements of JICA-supported *Kaizen* projects in Tunisia and Ethiopia and discusses the lessons learned. Tunisia and Ethiopia are front-runner countries in Africa which have been learning and developing their own models of *Kaizen* promotion. Three pillars are presented as essential elements for the sustainable development of *Kaizen* and are used as an analytical framework for the comparison: (i) vision, policy, and strategy; (ii) mechanism, organization, and system; and (iii) three levels of capacity (individual, organizational, and network levels). The comparative analysis shows the six factors that could importantly affect future *Kaizen* promotion in the two countries: (i) national leaders' commitment; (ii) political and administrative stability; (iii) organizational structure for *Kaizen* dissemination and development; (iv) counterpart and foreign expert teams in customization; (v) capacity required for advanced-level *Kaizen*; and (vi) industry-government-academia collaboration and the role of development cooperation.

Chapter 8 analyzes Thailand's experience with technology promotion and technical education by learning and localizing Japanese-style manufacturing, through two case studies of the Technology Promotion Association (Thailand–Japan) (TPA) and the Thai-Nichi Institute of Technology (TNI). TPA is a NPO established in 1973 by the initiative of Thai students and ex-trainees who studied in Japan, to promote the introduction and dissemination of new industrial technology from Japan for Thai people and enterprises. TNI is a technical education institute established in 2007 by TPA, with an emphasis on field-oriented, practical education for manufacturing and other industries. TPA and TNI successfully developed localized mechanisms for promoting industrial technologies, technical education, and training in industry circles and broader segments of the Thai society. The chapter also considers key factors for their success including the role of Japanese industrial cooperation. It also reviews their recent efforts to cope with the new challenges of industrialization in the age of digitalization, as well as the changing nature of the partnership between Thailand and Japan.

1.4.2.3 Translative Adaptation in a Changing World

Part III (Chaps. 9–10) considers the way forward and translative adaptation in the context of the new landscape of industrial development characterized by globalization, digital transformation, and pandemic.

Chapter 9 studies the human development aspects of *Kaizen*, with special attention to the relationships between the core capacities nurtured by this practice and non-cognitive skills. In the age of digitalization, non-cognitive skills—the personal attributes such as perseverance, self-control, and social skills—are becoming increasingly important because tasks that require such skills cannot be replaced easily by AI. This chapter reviews the evolution of *Kaizen* and its relation to theories of leadership, motivation, and capacity development. Based on cases of *Kaizen* promotion in Africa, it then argues that: (i) non-cognitive skills of adult workers can be developed through group activities of *Kaizen*; (ii) continuous efforts backed up by small successful experiences are important factors for adaptation amidst change; and (iii) further research on *Kaizen* in the context of psychology and behavioral science is required. In conclusion, the chapter emphasizes that *Kaizen* can improve not only quality and productivity of work but also human skills and capacities to enable proactive adaptation to change, which can bring support for the improved wellbeing of individuals in the coming era.

Chapter 10 presents the new industrial landscape by discussing contemporary mega-trends such as globalization, digitalization, and environmental response, and draws implications for developing countries and Japanese industrial development cooperation. The shape and scope of industrialization is rapidly changing with the expansion of GVCs, digital transformation, and the development of Industry 4.0. There is also a drive toward realizing inclusive and sustainable industrial development and enhancing economic and social resilience to 'build back better' after the COVID-19 crisis. The chapter discusses opportunities and new challenges for developing countries to accelerate industrialization in today's context. As a benchmark case study, the chapter features the automotive industry, which is a giant transformative industry facing dynamic changes under the four mega-trends. Finally, it argues that while the basic nature of industrial policymaking remains the same, Japan needs to upgrade its capacity for industrial cooperation by adding new developmental values and instruments as well as promoting co-creation with developing countries—learning together, solving problems together, and facilitating mutual knowledge accumulation.

1.5 Findings of the Remaining Chapters and the Way Forward

The final section summarizes key findings from the analyses in the subsequent chapters and discusses their implications for today's developing countries and the international development community including Japan. This section is divided into two parts. The first part presents the findings related to the 'key ingredients of translative adaptation and effective local learning' process (presented in Sect. 1.2.1), and the second part considers the implications of the new industrial landscape and the way forward.

1.5.1 Findings Related to the Key Ingredients of Translative Adaptation and Effective Local Learning

There are five main points emerging throughout this book.

1.5.1.1 Passion for Learning to Industrialize

Passion for learning to industrialize is essential. Case studies suggest different patterns of learning initiatives by diverse actors, but they all confirm that enthusiasm and strong ownership on the part of the recipients are critical. Without this, local learning and translative adaptation would not be possible.

The experience of Meiji modernization shows the intensity of the interest and seriousness of national leaders toward industrialization (Sect. 1.3.2, see also Chap. 3). In Singapore, it was Prime Minister Lee Kwan Yew who became convinced of the need to transform the mindset of workers and people for higher productivity, through meetings with Japanese business leaders. He himself launched the Productivity Movement and asked for Japanese cooperation to share its postwar experience of national movements (Chap. 4). In Ethiopia, Prime Minister Meles was eager to learn from East Asian development experiences. After learning about JICA's *Kaizen* cooperation in Tunisia, he immediately approached the Japanese ambassador in Ethiopia and requested Japanese assistance for *Kaizen* and an industrial policy dialogue (Chap. 5). In Vietnam, the General Secretary of the Communist Party, Do Muoi was greatly impressed with Shigeru Ishikawa's deep insights and recommendations on the strategy for Vietnam's market economy, which differed from the big bang approach widely implemented in Russia and Eastern Europe with the support of the international development community at that time. Do Muoi invited Ishikawa to advise the five-year development plan via diplomatic channels, in a search for policy options. This is how the Ishikawa Project began (Chap. 5).

Local learning initiatives should also come from the private sector, and not be limited to the national leaders mentioned above. Case studies also suggest that success stories, as observed in East Asia (Sect. 1.3.3), inspire others eager to learn, stimulate the 'yes, we can' spirit, and create a powerful demonstration effect.

1.5.1.2 Need for Systematic and Practical Learning

Learning methods matter. Passion is a prerequisite, but it is not enough. Case studies highlight the importance of systematic and practical learning by latecomer governments and society. In this regard, the three-step process of policy learning and translative adaptation (Fig. 1.2) can serve as a useful reference, but there are some caveats to keep in mind.

First, when learning from foreign models, the recipient side needs to select appropriate benchmark countries and gather the necessary information in light of its own stage of development, the relevance of its sectors, and the specific issues to be considered. It is important not only to understand the general features of the best practice models, but also to identify what are the commonalities for success and what are the country-specific elements. Careful monitoring and necessary adjustments should be made in the process of testing and implementing the imported model, toward building a model that best fits the local context. In this regard, the case of HaUI shows how it introduced the Japanese model of industry engagement in TVET from the viewpoint of its current capacity and the extent of support from industry, after studying several foreign models through donor-funded projects (Chap. 6).

Second, the policy learning process does not end with the three stages (learning, adaptation, and scaling up). Some case studies show development beyond. Singapore, after learning productivity tools and the experience of a national movement from Japan in the 1980s, began to share its know-how with Asia and Africa. This is a phase of internationalization (Chap. 4). In Thailand, with the establishment of TNI, TPA has created a mechanism for promoting *monodzukuri* education in broader segments of the Thai society including youths and working adults, thus contributing to societal learning. More recently, TPA and TNI are actively engaged in sharing and teaching their experiences abroad, particularly with other Asian economies (Chap. 8).

1.5.1.3 Learning As a Dynamic Process

Learning is a dynamic process. Latecomer governments often face the dilemma of 'the state as solution and problem' [7], but case studies show that step-by-step enhancement of policy capability is possible. Meiji Japan is a brilliant example. After repeated trial and error over industrialization efforts, state leaders finally came to formulate a vision for industrialization that is based on the reality of the industrial sector and reflects the views of industrial entrepreneurs (Chap. 3). The other case studies of Japanese cooperation for industry engagement in HaUI (Chap. 6), *Kaizen* promotion in Tunisia and Ethiopia (Chap. 7), and technology promotion in Thailand

(Chap. 8) all show phased approaches to capacity development. Under these projects, initially, Japanese experts took the lead in teaching counterpart personnel, but with the emphasis on the training of trainers, local personnel have gradually acquired skills and knowledge and come to assume a leading role in teaching the other local human resources.

This is why we argue the usefulness of the dynamic capacity development approach to policy and societal learning.

1.5.1.4 Public–Private Partnership as a Key to Policy and Societal Learning

All of the case studies highlight the importance of public–private collaboration through different types of partnerships in promoting policy and societal learning. Three points are worth noting.

First, public–private partnership is essential for the government to understand the reality and needs of the private sector and enhance its capacity for industrial policymaking. Japanese MITI is well known for its effective partnerships with the private sector, within an arm's length relationship. Through a deliberation council and other channels, government, public organizations, enterprises and their associations, and other stakeholders exchanged information and co-created innovative solutions (Chap. 2). These are the results of cumulative efforts from the time of Meiji Japan as mentioned above. As the Meiji government enhanced its policy capacity, and as the private sector grew, interactive communication between the government and private sector expanded and deepened (Chap. 3). In this way, the government can also learn from the private sector to enhance the content and quality of its industrial policy.

Second, public–private partnership is important to promote societal learning. The cases of Brazil (food value chain) and Chile (the salmon industry) show the role of specialized government R&D institutions in attaining many indigenous learning and innovation by sharing know-how and technology acquired through international cooperation with the private sector as public goods (Chap. 2). This process has substantially increased the productive capacity of newly established industries. In Thailand, as private sector initiatives, TPA (NPO) and TNI (university) have built multifaceted networks among industry, government, and academia both in Thailand and Japan (Chap. 8). These have contributed to amplifying learning opportunities and promoting technology dissemination within the industry circle and broader segments of the society.

At the same time, several projects point out the need for further efforts to strengthen public–private partnerships. The case studies from Tunisia and Ethiopia discuss the challenge of developing 'network' capacity for the sustainable development of *Kaizen* and suggest the need to develop industry associations and private *Kaizen* consultants and then to build industry-government-academia partnerships through a step-by-step approach (Chap. 7). This is because the private sector has an important role in disseminating *Kaizen* methods and philosophy through enterprise activities. The HaUI project in Vietnam also aims to build effective industry engagement in

TVET to supply young people with skills and knowledge that meet industry needs (Chap. 6).

Third, the degree of private sector dynamism greatly influences who initiate and lead societal learning. Where a dynamic private sector exists, it can take a lead in initiating, scaling-up, and sustaining a productivity movement, and the government can play a supportive role. This was exactly what happened in postwar Japan. However, if the private sector is weak as it was in the cases of Singapore and Ethiopia (Chaps. 4 and 7)—which is the situation in many developing countries, the government is better positioned to lead the process of the introduction, adaptation, and development of the productivity movement with societal participation. Private sector dynamism also includes the absorptive capacity to learn, adapt, and internalize foreign technology. This is where the level of education and training of the general workforce becomes important.

1.5.1.5 The Role of Development Cooperation in Enhancing Policy and Societal Capacity

Technology transfer through development cooperation is often characterized by an asymmetric balance of power. Nevertheless, case studies suggest that donors could play a role in facilitating translative adaptation and effective learning in partner countries if they are proactively engaged in understanding and accepting the values and views presented by local partners. Three points are worth noting.

First, when advising on 'foreign models,' donors should be mindful of providing a comparative perspective to the partner country, not just absolute advice on 'international best practices.' Comparative perspectives may include those across countries, regions, time, and sectors. In any comparison, there will be both commonalities and uniqueness. The key is to determine exactly what is common and what is unique, rather than general truth, and to build a model that best fits one's own society (Chap. 5). The Ethiopia-Japan bilateral industrial policy dialogue provided much advice on benchmark countries by industry (e.g., automotive, apparel sector) and by function (e.g., FDI and local firm linkage building, handholding support, industrial park management, inter-ministerial policy coordination). This requires an enormous amount of knowledge, experience, and/or trial and error. This is why policy dialogue requires a lot of research, patience, flexibility, discovery, and innovation on both sides.

Second, case studies confirm that most Japanese industrial cooperation takes a hands-on approach with an emphasis on 'learning by doing.' Such an approach can be observed in JICA's support to HaUI in Vietnam (Chap. 6) and *Kaizen* promotion in Tunisia and Ethiopia (Chap. 7). Chapter 6 points out that the accumulation of small successes, with hands-on assistance from Japanese experts, have contributed to their counterparts confidence by letting them decide to build their own institutions and mechanisms. But, it also admits that this approach alone is not sufficient to reach out to the policy level, and that weak government recognition and support may limit the national-level diffusion of the adapted model. Chapter 7 also recommends that for the

sustainable development of *Kaizen*, donors should work with partner countries from the early stages of the project to draw up three pillars (vision, policy, and strategy; mechanism, organization, and systems; and capacity (individual, organizational, and network levels).

Third, the above points suggest the importance of combining policy dialogue with concrete actions on the ground (Chap. 5). This should contribute to the scaling up and institutionalization of the adapted model, while helping to test the validity of the recommended policies through practical actions.

1.5.2 Implications of the New Industrial Landscape and the Way Forward

The shape of industrialization is rapidly changing in the twenty-first century, with digital transformation, a drive toward realizing inclusive and sustainable industrial development, and the expansion of GVCs. The COVID-19 crisis has further accelerated these mega-trends, although it is yet to be seen whether and how the COVID-19 and the recently intensifying geopolitical tensions might lead to the restructuring of global production networks. How will these contemporary mega-trends change the prospects for industrialization in developing countries? Based on the above findings and the analyses of the book chapters, we consider the implications of the new industrial landscape and the way forward from the following three perspectives.

1.5.2.1 What Aspects of Industrialization Prospects and Industrial Policymaking Will Change?

These contemporary mega-trends suggest that developing countries today have broadened opportunities to industrialize, through GVC participation, the creation of leapfrog technologies, and new business models emphasizing green and environmental sustainability (Chaps. 2 and 10). For example, as a result of deepening GVC, more opportunities are open for developing countries to host production process that can be adopted on a small scale based on comparative advantages. Because 'industrialization can happen stage by stage in GVC (rather than sector by sector)' ([6], p. 278), developing countries do not have to prepare a 'full set' industrial base, nor do they need to worry about the sequence of which industries to start with. The digital revolution may provide an opportunity to 'bypass traditional stages of development to either jump directly to the latest technologies (stage-skipping) or explore an alternative path of technological development (path-creating)' [68]. Aiginger and Rodrik [3] also propose a new focus of industrial policy that emphasizes green industrialization and employment concern.

In particular, digital technology is transforming the process of manufacturing, enhancing efficiency and connectivity of various industrial activities through the

Internet of Things (IoT), and driving innovation. It also contributes to creating new businesses, typically the modern service sectors with high productivity such as information and communications technology (ICT), financial services, business services, as well as start-ups which may lead to 'leapfrog' development. As a result, manufacturing and the other sectors are becoming interdependent and mutually reinforcing [11]. This is why currently, lively debates are underway as to whether manufacturing-centered industrialization, which was successful in East Asia in the late twentieth century, will remain a relevant development strategy for today's latecomer countries and whether services will become the growth sector of the future [10, 35].

In any case, the new industrial landscape will require adapting prioritization (including the role of ICT industry, digital technologies and skills, environmental concern), speedy response to policymaking and implementation, a greater focus on 'solution-driven' functions, while taking enhanced approach to sustainability, inclusiveness, and resilience. As the case study of automotive industry shows, the industry will require not only improving the traditional manufacturing process but also incorporating the mobility concept and carbon neutral technology (Chap. 10). Thus, the broadened scope of industrialization will demand a cross-cutting perspective more than ever, and industrial policymaking will need a nationally integrated approach to address complex challenges instead of separate ministerial actions.

1.5.2.2 What Aspects Will Not Change and Will the Japanese Perspectives and Learning Methods Remain Relevant?

Nevertheless, even under the new industrial landscape, the nature of development challenges is unlikely to change fundamentally. While GVCs open a new way to industrialize, the most difficult challenge for developing countries is to strengthen the capacity of local firms and human resources so that they could achieve and sustain economic transformation and value creation. This requires intensified efforts for learning and translative adaptation of the policy measures listed in the key areas of industrial policymaking suggested in Chap. 2 (also see Fig. 1.4). In Baldwin's words, the new landscape may change the nature of the 'master plan' of industrialization [6]. But the new 'master plan' needs to be properly formulated and effectively implemented, with good understanding of the prevailing economic situation, the needs of the business sector, and the international environment. These are entirely different tasks.

Therefore, we argue that the methods for policy learning and learning from foreign models discussed in this book—such as 'ingredients' approach with real sector concern, the role of agencies tasked with industrial policy, close partnership with the private sector, and dynamic capacity development approach—remain valid even if the scope for industrialization becomes broader and digital technology can be used for speedy communication. These are common issues to be learned and acquired regardless of time and place. We also argue that the lens of translative adaptation is more important than ever for developing countries today. Translative adaptation requires that 'any policy must be crafted and executed in the context of particular age,

society, and international environment' ([48], p. 25). In an inter-connected world, developing countries are required to exercise more sophisticated capabilities under strong country ownership that includes all actors in society, not just governments. Problems are getting more complex and comprehensive. Now that new knowledge and technologies are easily and quickly available to many people in a standardized format, there is an even greater need for active and effective societal learning by various actors for industrialization.

Lastly, we would like to note that *Kaizen* can be revisited from this new industrial perspective.[17] *Kaizen* encourages groupwork, voluntary participation, and the suggestion of original ideas, and can provide an important basis for developing core non-cognitive capacities required in the digital age (Chap. 9). Through quality and productivity improvement, it also has the potential to create renewed values such as: (i) approach to produce 'incremental innovation;' (ii) affinity with Industry 4.0 and digitalization; (iii) contribution to pandemic responses, e.g., sanitization and efficiency improvement; and (iv) contribution to inclusiveness through a human-centered bottom-up approach (Chap. 10).

1.5.2.3 Suggestions for the International Development Community and Japan: Toward Co-Learning, Co-Creating Knowledge, and Co-Solving Problem

We are now in the midst of major changes driven by globalization, digital transformation, pandemics, as well as increasing environmental and social concern. Moreover, the intensifying geopolitical situation is having a complex impact on the world's economic prospects, including those of developing countries. However, the world is constantly facing changes. What is most important for developing countries is to foster the policy and societal capacity necessary to formulate and implement prescriptions for industrialization that are appropriate for the time, country and society in question. In doing so, it is necessary to distinguish between the common aspects that should be adopted regardless of time and place and the country-specific unique aspects, in order to create the appropriate policy package for respective countries. Having said this, let me conclude this chapter by making three suggestions for the international development community and more specifically, Japan.

First, the international development community should make greater efforts to promote knowledge sharing on industrialization experiences, by incorporating the perspective of translative adaptation and local learning. The methods and content of knowledge sharing can be upgraded by including a comparative perspective of

[17] This point is well explained in Akio Hosono's closing remarks at the *Kaizen* seminar organized by the JICA Ogata Research Institute on February 27, 2020. With reference to stakeholder capitalism, Hosono stated: '*Kaizen* could be revisited from the perspective of these new initiatives' (See https://www.jica.go.jp/jica-ri/news/topics/l75nbg000019bubj-att/closing_remarks.pdf). The concept of stakeholder capitalism proposes that corporations should serve the interests of all their stakeholders including not just shareholders and investors but employees, customers, and the general public at large.

benchmarking countries—not just introducing a particular model of advanced countries—and embedding practical actions in the learning process ('learning by doing'). It is also important to engage the recent industrializers—those countries that have succeeded in industrialization not long ago—in sharing their experiences, particularly in light of how they learned from other countries and 'adopted and adapted' foreign models suitable to their respective countries.

Second, Japan needs to make enhanced efforts in this endeavor by collaborating with the recent industrializers based on its long-standing development partnerships and by acting as a facilitator of local learning and translative adaptation. Japan has fostered the 'ingredients' approach, field-orientation with hands-on approach through its experiences of industrial catch-up and development cooperation. These are the key elements of a dynamic capacity development approach and are tacitly understood and practiced by Japanese experts and professionals engaged in development cooperation. Therefore, more efforts are required to convert tacit knowledge into explicit knowledge so that these approaches and perspectives can be better utilized by other countries.

Lastly, it is increasingly important to emphasize the process of 'co-creation.' Japan (or advanced countries) must learn together with the partner countries and societies to find joint solutions ('co-learning' and 'co-solving'). This is because the development challenges in the twenty-first century have become more complex, sometimes going beyond what Japan (or advanced countries) have experienced in the past decades. Leapfrog technologies may be more easily tested and practiced in developing countries. Japan should also build intellectual networks with the other industrializers systematically so that their relevant experiences can be shared with developing countries. In this process, Japan may wish to play a facilitating role so that they can incorporate translative adaptation perspectives when sharing their industrialization experiences. Taken together, the process of 'co-creation' itself can be viewed as translative adaptation and can contribute to creating new values for development cooperation including Japanese cooperation.

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Chapter 2
Industrial Policies for Learning, Innovation, and Transformation: Insights from Japan and Selected Countries

Akio Hosono

2.1 Introduction

Over the last decade, a resurgence of interest in industrial policies has been witnessed at a global level. Goal 9 of the Sustainable Development Goals (SDGs), adopted by the United Nations (UN) General Assembly in 2015, is to 'build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation' [42]. To achieve this goal effectively, industrial policies will be needed, because 'promoting industrialization' is the fundamental aim of industrial policies. As such, it implies that UN member states adopting the SDGs inherently recognized the importance of not only industrial growth but also industrial policies that have a stronger focus on inclusiveness and environmental sustainability.

This chapter aims to obtain insights into an appropriate industrial policy package for today's developing countries as they face a variety of emerging challenges of industrialization, transformation, and growth. Section 2.2 reviews essential aspects and typologies of industrial policies and their instruments, with special reference to learning. Drawing from these typologies to provide a comparative perspective, this chapter examines the industrialization process and industrial policies in five countries in Asia and Latin America (Japan, Korea, Malaysia, Brazil, and Chile). To deepen the comparative analysis, Sect. 2.3 elaborates on the cases of three transformative industrial sectors—the steel industry, automobile industry, and resource-based industry. Based on these findings, Sect. 2.4 compares the experiences of each country in terms of the essential aspects and key instruments of industrial policies. Building on the

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analysis from Sects. 2.3 and 2.4, Sect.2.5 discusses the effectiveness of industrial policies in the five countries from the 'translative adaptation and indigenous learning' perspectives, with the conceptual framework (key ingredients for such adaptation and learning) presented in Chap. 1 of this volume. Finally, the chapter provides some concluding remarks.

2.2 Essential Aspects of Industrial Policies and Typology of Industrial Policy Measures

To undertake a comparative analysis of industrial policies and industrialization between countries, it is necessary to classify both industrial policy measures/instruments and processes in which these policies are formulated and implemented. This classification enables an examination of each country's industrial policies in terms of the package of instruments that has been adopted and how these instruments have been formulated and implemented. For this purpose, this section reviews some aspects of the emerging consensus on industrial policy, such as its broader scope, stronger emphasis on learning, structural transformation as an overarching purpose of industrial policy, typologies of key areas of industrial policy/instruments, and the process of its formulation and implementation.

2.2.1 Broader Scope of Industrial Policy

In recent discussions of development agendas, industrial policy is conceptualized to have a much broader scope than before, particularly in terms of the sectors to be promoted, policies to be implemented, and the purposes of industrial policy. Greenwald and Stiglitz [13] explain that 'The term is used more broadly than just those policies that encourage the industrial sector. A policy which encourages agro-business, or even agriculture, is referred to as an industrial policy' (3). More recently, Aiginger and Rodrick [3] asserted that, 'As the world economy turns increasingly towards services, it is clear that we will require a conception of industrial policy that addresses the need to nurture and develop modern economic activities more broadly, including but not limited to manufacturing. The appellation "industrial policy" may be misleading insofar as it clouds this broader mission. Other alternatives, such as "productive development policies," "structural transformation policies," or "innovation policies," do exist' (3–4). They also use the term "future- and welfare-oriented industrial policy."

2.2.2 Critical Role of 'Learning' for Industrial Policy

The importance of policy learning and societal learning, as discussed in Chap. 1, and enhancement of capabilities of governments, firms, and industrial human resources (workers, managers, and others) to successfully implement industrial policy—as well as to achieve industrialization—is now much more widely recognized. Noman and Stiglitz [31] noted that 'a particularly important set of industrial policies comprises those targeted activities that promote learning and technological upgrading' (1). Cimoli and Dosi [6], in their article "Industrial policies in learning economies," present a taxonomy of variables and processes that institutions and policies act on in general and with particular reference to technological learning. More recently, the United Nations Industrial Development Organization [44] highlighted the importance of learning for production capacity: 'Building production capacity takes time, as [this] requires a medium- to long-term process of learning and accumulating knowledge.' The above-cited authors emphasize the importance of learning and learning capacity for industrialization at large.

Furthermore, other authors argue that industrial policy is itself about learning. Agosin and Fernández-Arias [1] highlight that the book *Rethinking Productive Development: Sound Policies and Institutions for Economic Transformation*, to which they contribute, 'builds on a new policy paradigm that is emerging, namely that [productive development policy] is a learning process' (28–29). Aiginger and Rodrik [3] likewise affirm that 'The more ambitious the goals of industrial policy are, the less government knows about the techniques available to solve them. Industrial policy is therefore a search process in unknown territory, which should be open to new solutions, experiments, and learning.' In short, these authors argue that industrial policies are a learning process or a search process. Ohno [33], in his book *Learning to Industrialize: From Given Growth to Policy-Aided Value Creation*, proposes a 'way to learn pragmatic policymaking for developing countries that must cope with the strong pressure of market-orientation and globalization of our time' (ix).

2.2.3 Structural Transformation as an Overarching Purpose of Industrial Policy

Industrialization is a key to the structural transformation of economies. Together with the broader scope of industrial policy and the centrality of learning, we are witnessing a growing emphasis on structural transformation as an overarching purpose of industrial policy in the literature from recent years. Among the studies, Crespi et al. [7], Noman and Stiglitz [30], UNCTAD [43], and McMillan et al. [27] include 'transformation' in the title of their books/articles. The growing concern over structural transformation is partly due to the stronger need for employment opportunities, as highlighted by UNCTAD [43]. Today, as the SDGs set out, 'there is growing pressure to reduce unemployment and stimulate economic growth in the industrialized world

and to create more and better employment in developing countries. These needs have revived interest in industrial policy, putting structural transformation at the core of the policy agendas of many developing and developed economies and making it the focus of one of the United Nations' Sustainable Development Goals (Goal 9)' (2). As noted above, Goal 9 of the SDGs is to promote inclusive and sustainable industrialization.

2.2.4 Typology of Industrial Policy Instruments/Measures

From the above-mentioned perspectives, the cited authors identified and classified key areas or domains of industrial policies and their instruments. Ohno [33], drawing mainly from East Asian experiences, lists a number of standard policy measures. He especially highlights 'measures that enhance industrial human resource and enterprise capability, an objective that should be at the core of a nation's industrialization strategy' (63). Policy measures are classified into the following seven areas: legal and policy frameworks, industrial human resources, enterprise capability, finance, foreign direct investment (FDI) attraction, marketing and business linkages, and innovation (63–64). In addition, he states that there are also other important industrial measures related to infrastructure, logistics and distribution, social and environmental issues, and regional development.

Stein [38] classifies industrial policies into vertical policies (focusing on specific sectors) and horizontal policies (broad-based and not attempting to benefit any industry in particular). Each of these two categories of policies is further divided into public inputs and market interventions. Consequently, there are four groups of policies: horizontal public inputs, horizontal market interventions, vertical public inputs, and vertical market interventions (33–35). This classification takes into account the problems of rent-seeking and capture. For example, 'rent-seeking problems are likely to be more prevalent in the case of vertical interventions' ([38], p. 35). Crespi et al. [7], based mainly on Latin American experiences, as well as the above-mentioned conceptual framework by Stein, discuss seven key areas: policies to foster innovation, policies in support of entrepreneurship, technical education and training for work, finance, cluster-based policies, internationalization (exports, FDI, and GVCs), and priority sectors for productive transformation.

McMillan et al. [27] discuss a set of conditions that are most crucial for effective industrial policy leading to economic transformation (45). They define economic transformation as a continuous process of (i) moving labor and other resources from lower to higher-productivity sectors (structural change) and (ii) raising within-sector productivity growth. They provide a typology of policy approaches for supporting economic transformation: 'those [policies] intended to accelerate the relative growth of higher value-added sectors in the economy—in other words, policies to support structural change—and those intended to accelerate the pace of within-sector productivity growth.' Within each of these policy sets, they further distinguish 'between "horizontal" or enabling interventions and targeted interventions.' This produces a

two-by-two classification matrix (ix, 26). They list 'targeted policies to support structural changes' comprising export push policies, exchange rate protection, selective industrial policies, spatial industrial policies, and national development banks. As 'horizontal policies to support structural changes,' they include investment climate reforms, financial sector development, and strengthening state-business relations (26).

Andreoni [5], through an extensive overview of the literature on the typologies of industrial policies, presents a taxonomic approach. He distinguishes, first, between supply-side and demand-side measures. Then he subdivides supply-side measures into six specific factor-inputs policies: (i) innovation and technology infrastructure; (ii) higher education and workers' training; (iii) production capacity and advanced manufacturing operations that include conditional subsidies and incentives, with matching grant schemes; (iv) long-term financial capital; (v) resource access (energy and technology policies); and (vi) infrastructure and networks. Demand-side measures include internal demand and public procurement, and external demand and international market development (258–260).

2.2.5 Key Policy Areas and Domains of Industrial Policy

Summing up, the typologies referred to above generally coincide in three essential supply-side measures related to learning, capabilities, and innovation: (i) education, training, and nurturing industrial human resources; (ii) firms' capabilities; and (iii) technology and innovation.[1] Moreover, they coincide in two other supply-side measures: (iv) finance, and (v) infrastructure. Most of these industrial policy measures are intended to provide public goods for industrialization. The typologies also include policy measures related to internal markets, international trade, and foreign investment, which are normally related to both demand and supply sides, such as (vi) domestic market (size, protection, and competition); (vii) international trade, especially export promotion; (viii) foreign direct investment (FDI), and (ix) participation in global value chains (GVCs). These key policy areas are summarized in Table 2.1.

Section 2.3 below will build on these nine types of industrial policy areas—or domains—to compare countries' experiences in order to obtain insights for establishing an appropriate industry policy package for today's developing countries as they face a variety of new challenges of industrialization, transformation, and growth.

[1] These three supply side measures are interrelated and critical for societal learning, adaptation, and innovation. However, other policy measures are also very important for learning: for example, FDI and trade as channels for acquiring technology, infrastructure for communication as a vehicle for disseminating knowledge with wider or targeted populations, and so forth (see Chap. 1).

Table 2.1 Key policy areas and the process of industrial policy formulation and implementation

Typology	Key areas of industrial policy	Process of industrial policy formulation and implementation
Supply-side measures (related to learning, capabilities and innovation)	1. Education, training and industrial HRD	The role of government: public–private partnerships • Planner • Catalyzer • Coordinator • Rule-maker • Protagonist (SOEs) and biz.partner (JV etc.) Factors affecting the process • Types of industries • Purposes of industries • Phases of industrialization
	2. Firm capabilities	
	3. Technology and innovation	
Supply-side measures (biz. environment)	4. Finance	
	5. Infrastructure	
Demand and supply-side measures	6. Domestic market (e.g., size, protection, competition)	
	7. International trade (esp. export promotion)	
	8. FDI attraction	
	9. GVC participation	

Source Elaborated by the author, based on comments by Professor Izumi Ohno

2.2.6 *Process of Formulation and Implementation of Industrial Policy*

In the process of formulating and implementing industrial policy, most authors emphasize the importance of the relationship between the government and the private sector, together with their institutions. Ohno [33] argues that, 'if effective channels of public–private partnership are established, government and private firms come to trust each other and can constantly share information on global and domestic situations as well as strengths and weaknesses of local industries' (34). Primi [36] emphasizes that industrial policy works better when it has clear priorities and is capable of establishing a constructive dialogue between the public and the private sectors (180).

Andreoni [5] introduces a policy-governance model that is 'defined according to the way in which a country frames its industrial policy and the different actors involved in its design, implementation, and enforcement' (259). The key actors, according to Andreoni, are institutions such as government agencies and departments, development banks, intermediate R&D institutions, industry associations, and chambers of commerce. He argues that 'countries may frame their industrial policies either within *central plan-based strategies* or within *multiple decentralized initiative-based measures*' (259; emphasis in original). He further states that, 'to avoid industrial policy coordination problems, government that could rely on well-developed institutional settings adopted a multilayered policy model combining top-down and bottom-up policy measures' (259).

Stein [38] concludes that 'modern productive development policies have become less of a top-down affair, and increasingly involve public–private collaboration in

both policy design and implementation,' and that 'this collaboration is key, as the private sector has information about the sector's challenges and opportunities that is critical for effective policymaking' (58). Aiginger and Rodrik [3] also highlight the importance of the public–private relationship. They argue that 'the contemporary conception and practice of industrial policy is much less about top-down incentives and much more about establishing a sustained collaboration between the public and private sectors around issues of productivity and social goals' (4). As mentioned above, they consider industrial policy a searching process. Therefore, they state that 'government and business should engage in an intensive dialogue' (14).

The roles of the public sector in the above-mentioned public–private relations appear to differ according to types of industries, purposes of industrial policies, industrialization phases, and so on. The government undertakes the role of planner, catalyzer, coordinator, and rule maker as well as protagonist (in cases of state-owned enterprises) and partner (in cases of public–private joint ventures, actions, initiatives, and so forth) in the process of industrial policy formulation and implementation.

2.3 Country Experiences

This chapter has so far discussed key issues of industrial policies, including policy measures and instruments, the process of formulation and implementation, and public and private relations. This section draws together these elements in examining the experiences of five countries, with special reference to the steel industry, automobile industry, and natural resources-based industries. These industries have been purposefully selected by taking into account their transformative impacts as well as their different sector-specificities in terms of forward and backward linkages, participation in GVCs, and economies of scale.

2.3.1 Japan

The process of industrial policies and industrialization in Japan after the end of World War II can be divided into four distinctive phases: first, post-war reconstruction through to the mid-1950s; second, high economic growth through to 1970 [34, 45]; third, the post-oil crisis phase through to the mid-1990s; and fourth, the low economic growth phase [45]. I will primarily discuss the first two phases because they correspond to the main process of Japan's catching up to advanced industrial countries through industrial transformation. Many of the industrial policies implemented and institutions established in these phases were essential for the prolonged industrialization process in Japan ([34], p. 479).

'The Policy Concerning Industrial Rationalization' (*Sangyō gōrika ni kansuru ken*), adopted in 1949 by the Cabinet, was 'one of the most crucial milestones of postwar Japanese industrial policy,' because it contained the seeds of the Japan

Development Bank (JDB), the Foreign Capital Law, the reform of the tax system to favor industrial growth, and the creation of the 'Industrial Rationalization Council (*Sangyō gōrika singikai*) ([22], p. 215). One of the most concrete results of this Cabinet's decision was the passing of the Enterprises Rationalization Promotion Law of 1952, of which the main policy measures were the tax system with preferential treatment, and the fiscal investment and loan program (FILP). Both of these were designed for strategic industries. Below, I will discuss the effect of this policy, focusing on the case of the iron and steel industry.

In 1954, the 'Comprehensive Policy for Economic Expansion' was agreed upon, and based on this policy, the 'Outline of the New International Trade and Industry Policy' was announced. These documents reflected the view within the Ministry of International Trade and Industry (MITI) that the only way to break out of Japan's inevitable balance of payment constraints was through 'heavy and chemical industrialization,' by which was meant the building of an industrial structure whose export products would have a much higher income elasticity of demand than Japan's traditional light industries, even though it flew in the face of so-called comparative advantages ([22], p. 228). The main industries promoted in this period were synthetic fiber, petrochemicals, machinery and machine parts, electronics, and so forth. I will discuss the case of the automobile industry later in this chapter.

From the end of the 1940s through the 1950s, several core institutions for industrial development were created. JDB was established in 1951. It had the autonomy to decide its lending based on its own appraisal without political bias. It had 'two important principles: one was self-finance and the other was complementarity with private banks' ([37], pp. 166–167). In the export promotion area, the Supreme Export Council—composed of the Prime Minister, ministers of MITI, finance, agriculture, and so forth—was established in 1954. Another new institution, the Japan External Trade Organization (JETRO), was established in 1958.

In June 1960, the Cabinet adopted the 'Plan for the Liberalization of Trade and Exchange.' Six months later, it formally adopted the 'Long-term Economic Plan' (well known as the Income-doubling Plan). In 1961, the Industrial Structure Investigation Council (*Sangyō kōzō tyōsakai*) was created. This council and the Industrial Rationalization Council were integrated into the Industrial Structure Council (*Sangyō kōzō singikai*) in 1964. Johnson [22] considers the concept of 'industrial structure' and the creation of the Industrial Structure Investigation Council as 'the most important bureaucratic response to liberalization' (252–253).

The main objectives of industrial policies in the 1960s could be summarized as follows: (i) to establish a new industrial structure to address liberalization of trade and capital flow; (ii) to coordinate 'industrial plant and equipment investments' (*Setubi tōsi*); (iii) to promote coordination and specialization of production, especially of small and medium-sized enterprises (SMEs) through the Law for Promotion of Modernization of SMEs; (iv) to establish an integrated energy supply system; and (v) to promote some strategic industries on the basis of laws enacted in the 1950s, such as the machinery industry, electronic industry, and so forth ([41], pp. 55–56).

2.3.1.1 Japan's Steel Industry

Japan's production of steel before the end of World War II peaked at 7.65 million tons in 1943. It recovered to this level in the first half of the 1950s, before reaching 9.41 million tons in 1955. The expansion of production in the high-rate growth period was remarkable: it peaked at 120 million tons in 1973, the year of the oil crisis. Steel was mainly produced for the domestic market in the 1950s. Japan's steel exports were 3 million tons in 1960. Exports increased rapidly, achieving the level of 34 million tons in 1975. The share of the total exports from Japan increased from 9.6% in 1960 to 18.2% in 1975. Japan's share of world steel exports increased to more than 20% at the beginning of the 1970s ([24], pp. 58–59, 62).

In this process, the steel industry's investment in plant and equipment was facilitated by finance from JDB, special and accelerated depreciation, and other industrial policy measures. At the same time, three 'Steel Industry Rationalization Plans' (1951–1955; 1956–1960; and 1961–1966) and licenses granted for the import of foreign technology facilitated the modernization and technological upgrades. These policies were considered effective for the steel industry's development and technological progress in its initial phase, especially in the 1950s, and for establishing the basis of the steel industry's growth in subsequent phases ([41], p. 275). It should be emphasized that strong competition among steel companies was an important factor for the industry to achieve these results.

With these policies, investments were made in integrated steel mills. These financed new blast furnaces, strip mills, continuous casting methods, LD converters (BOF), and so forth, together with expansion of the scale of production. This modernization and technological progress, along with the location of these mills in industrial estates in coastal industrial areas, was advantageous for international trade. Moreover, the introduction of large-scale vessels specialized in transporting iron ore significantly improved the competitiveness of the Japanese steel industry. These factors enabled Japan to reduce the costs of steel production. The total costs were higher than the US in the mid-1950s (at 1.08 times the US cost in 1956), but were reduced to a level much lower than US costs by the mid-1960s (0.63 in 1966) ([47], p. 263).

Essential and cutting-edge technologies for steel production, such as LD converters and continuous casting, were adapted and improved in Japan. The strategy of locating steel mills in coastal areas and the introduction of iron ore carriers was effectively indigenous. As such, the development of the steel industry of Japan was not just a catching-up process. It was rather an indigenous learning, adaptation, and innovative process.

2.3.1.2 Japan's Automobile Industry

Production of automobiles in Japan increased from 69,000 cars in 1955 to 1,876,000 cars in 1965 and 6,946,000 cars in 1975. It was led first by the domestic market in the 1960s, and export-led development started in earnest in the 1970s. Japan's export

of automobiles comprised 7,000 cars in 1960 but had increased to 1,827,000 cars by 1975 ([24], p. 152).

The main promotion policies for automobile industry development consisted of finance from JDB and the Japan Finance Corporation for Small and Medium Enterprise (JASME). These also included, among other factors, special depreciation, licenses for the import of foreign technology, and exemption on tariffs for machinery and equipment imports. Restrictions of automobile imports and constraints on FDI in the car industry were the main protective measures, but they were gradually liberalized in the 1960s (the import of commercial vehicles in 1961, import of passenger cars in 1964, and FDI in 1971). Competition among Japanese automobile companies was fierce, both before and after liberalization.

Efforts were made to adapt and develop technologies and to work out innovative solutions in order to address a series of challenges that faced the Japanese automobile industry. Some of the most important of these were the development of supporting industries largely made up of SMEs and the introduction and dissemination of Japanese-style management methods to improve quality and productivity—such as Total Quality Management (TQM), the Toyota Production System (TPS), and another systems commonly known as the *Kaizen* approach [21]. The Japanese automobile industry also needed to address low-quality roads and highways, as well as narrow streets in major urban areas, in the initial phase of motorization—and later, air pollution. From the 1950s through to the mid-1960s, buses and trucks led automobile industry development. Regarding passenger cars, light vehicles (K cars), which proved convenient and affordable for Japanese consumers, have been developed intensively since the mid-1950s.

The Act on Temporary Measures for the Promotion of Machinery Industry, passed in 1956 (valid until 1970), was one of the major instruments for the development of a supporting industry for automobile production, consisting mainly of SMEs. The following three areas were promoted by this law: (i) basic machinery including machine tools, forging machines, cutting tools, molds, and electric welding machines; (ii) common parts including gears, screws, bearings, bulbs, and the parts necessary for material molding, such as die-casts and strong powder metallurgy; and (iii) specific purpose parts including automobile parts, sewing machine parts, watch parts, and railway vehicle parts. Many studies confirm that this law was very effective in the development of the machinery industry in general and the automobile parts industry in particular. Labor productivity of automobile parts production improved 21.4% from 1956 to 1961 ([32], p. 15).

2.3.2 Korea

The industrialization process in Korea can be divided into four distinctive periods: light industry-centered import-substitution industrialization (ISI) in the 1950s, transition to export-oriented industrialization in the 1960s, a heavy and chemical industry (HCI) drive in the 1970s, and further industrial upgrading, including the promotion

of information technology (IT) industries in the 1980s and onward. This chapter mainly focuses on the second and third periods.

Lim [26] states that, 'if Korea's transition to export-oriented industrialization in the early 1960s had mostly to do with discovering its latent comparative advantage in labor-intensive manufacturing, Korea's subsequent development had more to do with upgrading its comparative advantage with a view toward increasing the domestic content of its exports' (76). Finance for strategic sectors, export promotion, and technology development were among the main instruments of industrial policy in this process. Yo [48] notes that policy-based finance was the most important. The lending capacity of banks was strengthened in 1962. Several public banks for specific sectors were created in the 1960s. Policy-based finance comprised more than 50% of the total lending of banks from the 1960s through to the mid-1980s (3). Export promotion was another important instrument of industrial policy in Korea. From 1964 President Park Chung Hee chaired monthly export promotion meetings. The interest rate for export finance was less than half of the market rate. Export finance constituted 62% of total policy-based finance for the manufacturing industry in the period between 1962 and 1980 (4) (see Sect. 2.4 for more details on export promotion in Korea).

The HCI drive was formally launched in 1973 by President Park with the objective of firmly establishing 'a self-reliant economy' and achieving 10 billion USD in exports by 1981. Six industries were selected as leading industries: (i) iron and steel, (ii) nonferrous metals, (iii) shipbuilding, (iv) machinery, (v) electronics, and (vi) chemicals. Lim [26] argues that the 'HCI drive helped to build the formation of many of Korea's leading industries. […] It greatly strengthened backward and forward linkages among these industries as well as related industries such as automobiles, to increase the local content of exports' (79). The HCI share of total manufacturing production increased to a higher level than light industries in the mid-1970s and 59% in 1985 ([48], p. 7). As regards technology development, the public sector played a dominant role in R&D, mainly through newly established government labs in the 1960s and 1970s. However, as Korean firms came to realize that they should go beyond imitation and assimilation and do their own innovation to succeed in the global market, they began to drastically increase their R&D spending ([26], p. 79).

2.3.2.1 Korea's Steel Industry

Until 1973, Korea had no capacity to produce the iron needed for steel production. Consequently, scrap or crude iron was imported to produce steel using small electric furnaces. The government had to depend on external finance and foreign technology when it commenced plans to establish the Pohang Iron and Steel Company (POSCO) and construct the first integrated steel mill at the beginning of the 1970s. The production volume of POSCO increased from 2.1 million tons in 1976 to 9.5 million tons in 1986, when the company attained its status as one of the top steel mills in the world.

The crucial factor which enabled this successful development of POSCO was very active support from the government, especially from the President. Through this

support, POSCO was able to obtain external finance, favorable conditions for technological transfer, construction of related infrastructure, and so forth [40]. Another important factor was the intensive efforts of POSCO to develop its own engineering capacity through the four phases of plant construction. The availability of very high-quality labor and the low level of turnover was also crucial.

Korea's high learning capacity was praised by Amsden [4]. Thanks to aggressive technology acquisition, it did not take long for POSCO to become technologically self-dependent. It implemented a lot of improvements and adaptations of absorbed technology at the Quality Control Department and production sites. It began to develop new products and finally decided to centralize R&D activities by establishing an R&D center in 1977. Furthermore, POSCO became an exporter of its own technology towards the end of the 1970s [18].

2.3.2.2 Korea's Automobile Industry

The law for the protection of the automobile industry was promulgated in 1962 by establishing restrictions on imports of automobiles and parts. Car production was started through technological contracts with foreign companies. However, due to the limited size of the domestic market, it was difficult to achieve the economies of scale of production required to achieve competitiveness. In 1973, the government announced an ambitious long-term plan for developing the automobile industry, establishing targets for integrated production of national cars based on original models, parts production and assembly with the competitiveness to export. Hyundai was the only company able to satisfy the requirements of the plan. In 1975, the company made a large-scale investment in constructing a new plant to produce the first national model, Pony, in a joint venture with Mitsubishi together with technology transfer ([28], p. 188).

The second oil shock of 1979 led to a severe recession in the automobile industry. Measures for the rationalization of this industry were announced in 1981. As the country recovered from the recession, production of automobiles (including trucks) increased from 123,000 cars in 1980 to 2.5 million cars in 1995, with Korea becoming the fifth largest country in terms of car production. Exports of cars increased from 25,000 to 1.0 million during the same period. In this process, the leading player was Hyundai, which attained economies of scale in increasing exports. It started to develop its own original model in 1990, achieving the production of original engines and transmissions in 1994.

2.3.3 Malaysia

Four phases can be distinguished in Malaysian industrialization after independence: the ISI-led process through the 1960s; export-oriented (EO) and inter-ethnic redistribution policies in the 1970s; heavy industrialization policies (1981–1985) followed

by economic liberalization in 1986–1997 (First Industrial Master Plan, IMP I); and post-economic crisis management and IMP II and III. This section focuses on the second and third phases.

In the second phase, export orientation (EO) based on the attraction of FDI was the main approach. Two main types of export-oriented industries were developed. First, 'resource-based industries have involved the increased processing of older (e.g., rubber, tin) and newer (e.g., palm oil, timber) primary commodities for export.' Second, many non-resource-based export industries have mainly involved the relocation of certain labor-intensive manufacturing processes to stable, low-cost environments, such as those offered by Malaysian free trade zones (FTZs) with the Free Trade Zone Act of 1971, and licensed manufacturing warehouses (LMWs). The most dramatic growth has involved electrical and electronic components ([23], p. 11). Foreign companies that operated their plants in FTZs and benefited from LMWs were the main driver of EO. As such, EO and FDI attraction by government institutions, including the Malaysian Investment Development Authority (MIDA), have been closely related.

In the third and fourth phases, heavy industrialization initiatives were implemented under the leadership of Mahathir with his 'Look East' vision aimed at learning from Japan, South Korea, and Taiwan. The Heavy Industries Corporation of Malaysia (HICOM) was set up in 1980 to further diversify manufacturing activity, develop more local linkages (which both ISI and EO failed to do), promote small and medium Malay enterprises, and lead technological development by collaborating with foreign firms and investing in local R&D. Mainly involving joint-ventures with Japanese firms, ownership of these industries was dominated by the government before the sale of shares to the public from the mid-1990s ([23], p. 13). The establishment of Proton, a national carmaker, in 1983, was driven by 'the economic motive of creating a broad industrial base as well as a social motive of assisting Malay workers and Bumiputra firms' ([33], p. 221). The First Industrial Master Plan (IMPI, 1986–95) aimed at outward-looking industrialization, modernization of supporting industries, and strengthening of industrial linkages. A number of liberalization measures were undertaken in this process.

2.3.3.1 Malaysia'sPalm Oil Industry

In line with the transition to EO industrialization from the late 1960s, the government introduced various new sectoral policies, which included encouraging resource-based industrialization, such as palm oil refining. Since 1968, duty exemptions for higher value-added processed palm oil products were introduced. In 1978, a more complex export duty formula was established to encourage additional processing. 'The palm oil refining industry is probably the most successful story of Malaysian resource-based industrialization. […] With a current estimated annual refining capacity of about 8 to 9 million tons, […] exports of processed palm oil grew at a compounded annual rate of about 25% over the past two decades, and accounted for 60% of the world's refined palm oil products' ([16], p. 162). In order to support the refining

industry, the government created institutions to assist with R&D, training, and market promotion: the Palm Oil Research Institute, Palm Oil Registration and Licensing Authority, and Malaysian Palm Oil Promotion Council. The incentives and new institutions, together with the enhancement of entrepreneurship and accumulation of skills, facilitated technological and organizational development (indigenization) that enabled optimization of processing, bulk processing and exports, and economies of scale. All of these contributed toward strengthening the industry's competitiveness ([16], p. 175). Today, Malaysia leads worldwide R&D and innovation in the palm oil industry. The country is deepening the value chain and extending it to higher value-added products, such as detergents, medicines, and bio-diesel. Local companies are the main players in the value chain ([12], pp. 136–137).

2.3.3.2 Malaysia's Automobile Industry

The automobile industry's development process in Malaysia between 1970 and 2000 can be divided into two phases. The first phase started with a policy to promote an integrated automobile industry. The government targeted an increase in local content in production from 10 to 35% between 1971 and 1982. However, due to the excessive number of assemblers in the small local market, it was difficult to achieve economies of scale, which resulted in high prices of cars with low levels of local content limited to tires, batteries, paints, filters, seat belts, and glass items. The second phase started in 1982 with a state-led 'national car' project for the country to become a full-fledged car manufacturer. Perusahaan Otomobil Nasional (Proton) was established in 1983 as a joint venture between HICOM (with a 70% share), Mitsubishi Motor Corporation, and Mitsubishi Corporation. This project 'became the most important instrument for heavy industrialization policy' ([33], p. 235). With strong support from the state, Proton managed to capture 77% of the domestic passenger car market and exported cars to 28 countries, accounting for 23% of total sales as of 1995. The government also initiated a second national car project named Perusahaan Otomobil Kedua (Perodua) as a joint venture between state firms and foreign firms, including Daihatsu [16].

The learning and adaptation process and its role in establishing the Malaysian automobile industry is summarized as follows by Ohno ([33], p. 236): 'Unlike neighboring countries, Malaysia took a go-it-alone approach to automobile manufacturing. It hoped to build core capacity and compete squarely in the world market instead of attracting foreign giants to form an automotive industrial base as done in most other developing countries […]. IMP II targeted the automobile industry as a vital sector in which internal development of technology and engineering know-how was top priority […].' Regarding Proton's achievements, he highlights that 'The existence of Proton as a hub of domestic car production enabled the development of local part and component makers through the Vendor Development Program. By the end of 2005, there were 4,865 automobile parts and components produced locally, and 286

suppliers in producing parts and components for Proton. […] Proton's effort at internalizing core automotive capability was admirable but not good enough to compete with global giants' ([33], p. 236).

2.3.4 Brazil

The process of industrial policy and industrialization in Brazil can be divided into four periods: the ISI-led process from the 1930s through to the mid-1950s, then a proactive industrial policy followed by heavy and chemical industries-led industrialization from the mid-1950s through the 1970s. In the 1980s and 1990s, there was increased liberalization with an emphasis on building technological capacity and competitiveness, and finally, there has been a return to industrial policies since 2004. This section focuses mainly on the second period.[2]

President Kubitschek's Plano de Metas (Plan of Targets) 1956–1961 was the first comprehensive ISI plan aimed at national economic integration. It had 30 development goals to realize the '50 years of economic progress in 5 years.' The Plan of Targets focused on energy and transport infrastructure, which were considered to be bottlenecks to development. The plan included sectoral strategies for agriculture and food (wheat production, grain storage, cold meat storage, slaughterhouses, agriculture mechanization, fertilizer), basic materials (steel, aluminum, ferrous metals, cement, chlorine, paper and pulp, rubber, iron ore export), and capital goods (automobile industry, naval construction, heavy electric materials, and machinery). Kubitschek also launched the Executive Group of Automotive Industry (GEIA), which was intended to attract foreign assemblers to install full-fledged production units in Brazil.

Experiences of increasing fiscal deficits and inflation through the mid-1960s were followed by successful macroeconomic stabilization from 1964 to 1967. Antonio Delfim Netto, the Finance Minister (1967–1974), issued the Strategic Plan of Development (PED, 1968–1970). The PED was the first to recognize the role of the National Economic Development Bank (BNDE, later National Economic and Social Development Bank: BNDES) as the leading institution of development policy. He considered that a government failure is more problematic than a market failure and approved the role of government in developing infrastructure and essential material industry. In the context of high economic growth in 1968–1973, the first National Development Plan 1972–1974 (I PND) was carried out. It focused on the construction of the infrastructure for transportation, telecommunications, and energy, created state-owned enterprises for naval construction, steel, and petrochemical industries, induced Brazilian enterprises to participate in strategic sectors, and paved the way for the triple alliance scheme of state, private, and foreign capital in industrial development. The second PND of 1974–1979 focused on basic industrial materials (steel, nonferrous metal,

[2] The following two paragraphs draw heavily on [15].

petrochemical products, fertilizer, pesticides, paper and pulp, materials for the pharmaceutical industry, nonmetal minerals, and products such as cement and sulphur), capital goods, food, and energy.

2.3.4.1 Brazil's Steel Industry

Brazil has a long history of charcoal iron production. The number of charcoal blast furnaces increased from 6 in 1925 to 134 in 1975, when iron production by charcoal amounted to 3.63 million tons. This was still higher than iron production by coke, in spite of the rapid increase of production by integrated iron and steel plants constructed in the 1950s and 1960s [39], as explained below. As such, Brazil had accumulated specific capabilities, knowledge, and specialized personnel related to iron production when the country started investing in the steel industry in earnest. Vargas created Companhia Siderúrgica Nacional (CSN), the first steel mill, in 1940, together with the Companhia Vale do Rio Doce (CVRD, later Vale), an iron ore mining firm, as well as a railway in order to transport iron ore from the center of Brazil to the Southeast, where the mill was going to be located. In the 1960s, BNDE financed about 70–80% of all capital investments in the steel industry [29].

From the viewpoint of absorbing cutting-edge technology, the development of the steel industry by another state company, Usinas Siderúrgicas de Minas Gerais S. A. (USIMINAS), is outstanding. Brazil and Japan agreed on the establishment of USIMINAS in 1957. BNDE provided much of the finance. The construction of the steel plant was carried out in cooperation between Brazil and Japan. As production partly started in 1961, three Japanese steel companies jointly dispatched nearly 500 persons to USIMINAS over the five years until 1965. By 1967, all the responsibilities of plant operation had been transferred to Brazilians. According to Dahlman and Fonseca [8], 'USIMINAS passed from know-how stage to know-why state' (163). In 1971, the National Plan for the Steel Industry was announced, and by the mid-1970s, USIMINAS had achieved blast furnace productivity comparable to that of Japan, which was the world leader during that period. USIMINAS's share of the total steel production of Brazil increased to 25% in 1976. Most significantly, USIMINAS maintained a high share of flat sheet products, which contributed substantially to the development of the shipbuilding and automobile industries in Brazil. Since the mid-1970s, USIMINAS has been in a position to provide technical assistance to other steel mills and downstream activities, such as capital goods industries. Brazil became the biggest exporter of steel products from the developing world, with a share of over 4% of total world exports in 1985 compared with only about 0.2% in the mid-1970s. USIMINAS was the first case of the privatization of a state enterprise in Brazil, taking place in 1991.

2.3.4.2 Food Value Chain in the Cerrado Region

The major regional action of the second PND was the agricultural development of the Cerrado, an area of tropical savanna in Brazil. This was initiated by the Central-West Region Development Program (POLOCENTRO, 1975–1979), followed by the Japanese Brazilian Cooperation Program for Cerrados Development (PRODECER, 1979–2001). Through these and other initiatives, Brazil achieved a significant transformation to become a top-class global exporter of grains and meat, strengthening food value chains in the Cerrado region previously considered unfit for agriculture. For this process, it was essential that soil management technologies be improved and new crop varieties suited to tropical zones be developed ([20], pp. 14–17). To address these needs, the Brazilian government judged that it was necessary to establish a public organization to foster the necessary technological innovations. The Brazilian Agricultural Research Corporation (EMBRAPA) was established in 1973, and EMBRAPA's Cerrado Agricultural Research Center (CPAC) achieved success very early. Financial resources were provided by the government and international cooperation programs ([19], p. 5). Together with the development of food value chains, the public–private partnership for the learning and innovation ecosystem in clusters of the value chain networks has been strengthened. This ecosystem involves farmers, providers of agricultural and agro-industrial inputs, food processing plants, traders, and other stakeholders ([19], pp. 23–24).

2.3.5 Chile

Chile's industrialization process can be divided into at least three phases: government-led ISI from 1938 to 1973, a liberalization and export- and FDI-led process in the 1970s and 1980s, and a renewed horizontal policy-led process in the 1990s and onward. This section focuses mainly on industrial policies of the 1970s through to the 1990s.

According to Agosin et al. [2], 'the import substitution stage of Chilean development (roughly from 1938 to 1973) saw an increasing emphasis on industrial policy.' Not only did the government protect domestic industry through high tariffs, but in addition, state agencies became the most important entrepreneurs in sectors such as steel, petroleum extraction and processing, sugar, electricity, and telecommunications. Agosin et al. [2] consider that, 'contrary to conventional thinking, many of these proved profitable.' The Corporación de Fomento de la Producción (CORFO)—a development agency established in 1939 with broad attributions including taking on the role of a development bank—was in charge of implementing the industrial policy (5).

Since the mid-1970s, the government started liberalizing trade and FDI, as well as privatization. The government removed practically all restrictions on FDI. DL 600 (a foreign investment law) was introduced in 1974. Under this law, foreign investors settled contracts with the Chile Foreign Investment Committee, which guaranteed the

application of provisions of DL 600. The government recognized the critical externalities of generic export promotion. Thus, early on, ProChile, an agency attached to the Ministry of Foreign Affairs, was set up to carry out such activities. However, most of the policies implemented in the second phase were of a horizontal nature. Since 1973 and until very recently, Chile basically eschewed vertical industrial policies with very few but significant exceptions ([2], p. 6).

In the period of the 1990s and 2000s, the government deployed myriad instruments of industrial policy, mainly through CORFO, but also through other institutions such as ProChile and even the line ministries. According to Agosin et al. [2], most policy instruments, including those of CORFO, were horizontal programs involving market interventions (through taxes or subsidies). They further state that, since the early 2000s, this insistence on horizontality has been giving way to a more realistic appraisal of the need to achieve a critical mass in the provision of government support. Today, Chile's most exported products, after copper, are salmon, forestry products, fresh fruits, and wine. This section discusses the salmon industry and forestry sectors, promoted mainly by vertical industrial policies.

2.3.5.1 Forestry Products Industry in Chile

One of the areas that the Chilean government has targeted most explicitly is the forestry sector through a mix of policy interventions, including laws, incentives, subsidized credit lines and other tools to attract private investments in the sector [25]. The military government made a strategic bet on a non-existent but potentially profitable sector. It had long been known that radiata pine grew faster in certain parts of Chile than practically anywhere else in the world. In effect, the authorities resolved a coordination problem, which allowed this sector to take off. In 1965 the Chilean government created the Forestry Institute, a technological research institute attached to the Ministry of Agriculture and the country's first institution responsible for conducting R&D in the forestry sector, specifically in areas of forestry economics and wood-related technologies ([2, 25], p. 7).

The Chilean authorities have successfully targeted the forestry sector through several tools and legal interventions. One of them was Decreto Ley 701, which granted cash subsidies amounting to 75% of the costs of planting and the initial management of forests. The Central Bank provided incentives and subsidized credit lines for investments in the forestry sector between 1974 and 1979 ([25], p. 19). Measures were also taken to ban the exploitation of forest trees younger than 18 years old, as well as the export of raw wood and debarked logs. These measures benefited the domestic cellulose and paper industries, which took advantage of low raw material prices. Another intervention—less vertical in its design but beneficial to the forestry sector in particular—was a program of debt-equity swaps introduced in 1985. Investments made as a part of the debt-equity swaps program stimulated the industrial processes needed to transform the developing forestry sector through value-added wood products.

2.3.5.2 Chile's Salmon Industry

Agosin et al. [2] affirmed that there was only one institution in Chile devoted to making strategic bets, Fundación Chile (FCh), in the 1970s and 1980s. Its most outstanding project was the salmon industry. Salmon did not exist in Chile until the 1970s. Today, Chile is one of the world's top salmon-exporting countries, on par with Norway. The salmon industry did not develop through voluntary private-sector investments from the outset. Market failure was averted by FCh and the Japan-Chile salmon project. FCh made an investment large enough to produce salmon through sea farming on a significant scale (one-thousand-ton program) and recouped this investment. FCh thus demonstrated the commercial profitability of large-scale sea farming in 1988 ([17], pp. 51–52). Furthermore, as a public good, it provided the technology to farm salmon for free or for a fee so as to allow many companies to invest in the salmon industry without having to make a sizable investment in R&D.

FCh, following this successful achievement, decided to sell the venture through international bidding. Nissui, one of the major Japanese fisheries, won the bid and became a pioneer in introducing advanced salmon processing technologies. Chile, in its ascendance as a world producer, has formed a full-fledged, overarching salmon value chain covering each phase from the production of salmon farming and a whole system of upstream goods and services (especially R&D) to processed products, marketing and export. In 2008, processed products accounted for 63% of total salmon exports of Chile. The Japan-Chile salmon project, implemented under an agreement between Chilean and Japanese governments for 20 years from 1969, provided technology and personnel trained by the project, which allowed private salmon firms to save on the cost of investment in R&D and training of industrial personnel.

2.4 Comparison of Industrial Policies in Key Areas: Insights from Country Experiences

Drawing on the case studies of Sect. 2.3[3] as well as the related literature reviewed in Sect. 2.2, I will compare the industrial policies of the five countries, focusing on key areas such as major industrial policy instruments, policy formulation and implementation, and public–private relations as shown in Table 2.1. First, essential industrial policy instruments in these countries will be compared. Regarding policies related to the supply-side, crucial areas covered in the literature are technology, long-term finance (development banks), and firm capabilities, particularly of SMEs for supporting industry. In relation to these, policies toward FDI will be discussed together because FDI normally provides technology and finance. Second, policies related to the demand side, competition in the domestic market, scheduled trade liberalization, and export promotion will be discussed. Third, public–private relationships in the process of policy formulation and implementation will be compared.

[3] Some findings not mentioned in Sect. 2.3 are referred to in this section.

2.4.1 Technology, Long-Term Finance, and FDI

Policies related to FDI, considered an effective vehicle for acquiring foreign technology and finance, differed widely between the countries. Korea and Japan were reluctant to count on FDI during the HCI drive, when FDI was not very widespread globally. ASEAN countries, which started HCI later, actively attracted FDI. Chile's process was FDI-led from the mid-1970s onwards. Brazil opted for a hybrid approach, both attracting FDI and promoting indigenous technology development together with establishing a powerful development bank. Combinations of these two were different among the diverse industrial sectors in Brazil.

Japan and Korea needed to import foreign technologies through licensing. Efforts to absorb such technologies with adaptation and proper innovation were comprehensive and far-reaching. Governments promoted and systematically supported indigenous technological development. For instance, in Korea, as Lim [26] states, 'the government established the Korea Institute of Science and Technology (KIST) in 1966 and the Korea Advanced Institute for Science and Technology (KAIST) in 1971.' Following this, 'it passed the Technology Development Promotion Law in 1972, providing tax and other incentives to encourage private-sector R&D. It also established five industry-specific research institutes in shipbuilding, electronics, machinery, metal, and chemical industries, according to the Specialized Research Institute Promotion Law of 1973' (10). In Japan, in addition to a similar systematic approach by the central government, efforts to support the technological development of SMEs are worth mentioning. As Andreoni [5] states, *Kosetsushi* (public testing/research laboratories) are run by regional governments (prefectures), providing support for local SMEs with a variety of quasi-public good technologies for testing, trial production, and scale-up, as well as training services. He further states that 'a number of sector-focused centers also support SMEs in the adoption of new advanced technologies and conduct joint applied research' (269).

In Brazil, the provision of technology has differed greatly between sectors—for example, automobiles, airplanes, and electronics. While FDI was the major driver in Brazil's automobile industry, as was the case for most of the ASEAN countries, indigenous technological development was the main vehicle in the case of airplane production by EMBRAER (Empresa Brasileira de Aeronáutica), which became one of the world's top airplane manufacturers. On the other hand, the 'unfortunate case of the electronics and informatics industry illustrates an ineffective industrial policy where the government just provided companies with protected local markets but did not extend support to basic research or human resource development' ([15], pp. 122–125; see also [1], pp. 16–18).

Regarding Malaysia, Jomo [23] concludes that, 'through various generous incentives, the government has sought to encourage investments in higher value-added economic activities as well as research, design and developing activities. Government policy has also created a range of institutions and programs to promote research activities, especially in the public sector, besides facilities and incentives for private-sector research and development. Although such government efforts have met with

limited success, there is evidence of significant technological progress in Malaysian manufacturing in recent decades' (xxiii).

The governmental role in R&D could be essential in the initial phase for the development of new industries, particularly when it is risky and/or costly for private companies to invest in the R&D required for such industries. The cases of Cerrado agriculture with the food value chain in Brazil and the salmon farming and processing industry in Chile are clear examples: R&D by EMBRAPA and a public–private entity, Fundación Chile, undertook the pioneering role of providing technology as a public good.

Regarding long-term finance, JDB played a crucial role in Japan. Commercial banks were important providers of finance as well. As Shimada [37] highlighted, JDB had, among other aspects, the following critical features: (i) it 'had autonomy to decide its lending based on its own appraisal, and without political bias' (166–167); and (ii) because of the complementarity among industrial sectors financed by JDB, 'the loans were used as a kind of subsidy to the target industries with "crowding-in effects" in mind […]. The complementarity or spillover effects among sectors are one of the important characteristics of the JDB loan' (167–168); (iii) a JDB loan sent 'an important signal to private banks (the *signaling effect* of the government's industry policy) to provide loans. JDB loans catalyzed loans from private banks by lowering the risk' (169; emphasis in original).

In Korea, the government established the National Investment Fund (NIF) to finance long-term investment in HCIs in 1973. Government-controlled banks also supported the HCI drive by providing policy-oriented loans on favorable terms ([26], p. 9). Gustafsson [14] affirms that 'the Malaysia government has not used development banking as extensively as South Korea has' (48).

In Brazil, the role of BNDES (former BNDE) was pivotal to remedying private financial institutions' short-term and risk-averse attitudes: 'Private bank loans are not only scarce and volatile in terms of volume, but they are also high-cost, and their loans are strongly skewed to the short maturity segment.' Moreover, 'BNDES has been central to industrial policy formulation with qualified technical staff and technical autonomy' [15]. In this regard, Ferraz and Coutinho [11] claim that 'BNDES had technical autonomy, namely a collective capacity to approve or reject projects based exclusively on an explicit project and credit evaluation criteria […]. It is widely accepted that BNDES has high competency to examine the eligibility of borrowers on a purely technical basis' [15].

As far as technology, long-term finance, and FDI are concerned, both horizontal and vertical instruments have been implemented in countries of case studies of Sect. 2.3. They have usually been complementary. Vertical industrial policy measures responded to each sector closely and enhanced the effectiveness of industrial policy, especially when the industrial policy was formulated with in-depth information about each sector, obtained through public and private partnerships [15, 45].

2.4.2 Firm Capabilities, Especially of SMEs

Strengthening firm capabilities and nurturing industrial human resources are among the most critical aspects of industrial policies, with an emphasis on learning for strengthening production capacity. In addition to presenting a standard policy menu for industrial capability enhancement (referred to in Sect. 2.2), Ohno [33] highlights six industrial policy measures among the most popular policy instruments for enhancing industrial capability in East Asia: *Kaizen* (quality and productivity improvement at factories), *Shindan* (enterprise management consultant system), engineering universities and technical colleges, TVET-industry linkages, industrial estates, and strategic FDI marketing (63–64, 65–80).

A SME policy is one of the most widely implemented policy packages for firm capability enhancement. In most East Asian countries, comprehensive SME support systems have been established. Both horizontal policies and vertical policies show effective results. Among the horizontal policies, a very widely applied approach is the introduction of the *Kaizen* method and several management systems based on *Kaizen* [21].

Among vertical policies, initiatives to strengthen automobile parts industries consisting largely of SMEs are worth mentioning. For industries that are dependent on thousands of parts, such as the automobile industry (which can involve 30,000–40,000 parts) as well as other machinery industries, the capabilities of parts suppliers are essential. To enhance the competitiveness of the automobile industry, both horizontal policies to support SMEs and vertical policies to promote key sectors for supporting industry are required. In Japan, the Act on Temporary Measures for the Promotion of Machinery Industry was very effective in this regard, as discussed below (see Sect. 2.4.4). In Malaysia, the government launched the Vendor Development Program (VDP), under which multinational and local 'anchor companies' would provide guaranteed purchasing contracts and technical assistance to local vendors, who would also receive subsidized finance from local banks and technical support from government institutes ([9], pp. 73–74).

2.4.3 Competition in Domestic Markets, Scheduled Trade Liberalization, and Export Promotion

In cases of industrial sectors requiring economies of scale, including the steel industry, petrochemical industry, and automobile industry, the size of the market matters. Domestic markets, together with (or without) export markets, need to be large enough to take advantage of the economies of scale. Given sufficient size, even if the domestic market is protected, domestic firms will be encouraged to improve their competitiveness when they face competition in domestic markets and/or trade liberalization is reasonably scheduled.

Export promotion was one of the most widely implemented approaches of industrial policies among all the countries studied. Korea introduced a number of measures to facilitate export-oriented industrialization. The short-term export credit system had been streamlined as early as 1961, with the automatic approval of loans to those with an export letter of credit (L/C). This allowed businesses to have access to trade financing without having to put up collateral. The government established the Korea Trade Promotion Corporation (KOTRA) in 1962. The government also gave exporters various tax deductions, tariff exemptions, and concessional credits: 'These subsidies took the form of performance-based rewards in a competitive setting rather than handouts with no strings attached' ([26], p. 75). After 1964, then-President Park Chung Hee chaired monthly export promotion meetings (for details of these meetings, see the next section).

In Japan, the mainstream vision in the mid-1950s was to promote both exports and domestic sales. Johnson [22] cites a Japanese analyst, who argued that 'the only industries in which we have seen export increase induce a production increment—instead of the other way round—are transistor radios and perhaps cameras. […] Export increases of all our other products have been induced mainly by expansion of the domestic market' (230). The Supreme Export Council and JETRO were created in 1954 and 1958, respectively. Scheduled trade liberalization and efforts to strengthen competitiveness to cope with liberalization became one of the main agendas of industrial policies of the 1960s.

In Chile, ProChile has been one of the main instruments of Chile's horizontal industrial policies from the late 1970s and onward. Today, ProChile is considered one of the most effective institutions for export promotion in Latin America.

2.4.4 Formulation and Implementation of Industrial Policies and the Public and Private Relationship

In Japan, the Industrial Structure Council is the central body of industrial policy formulation. Under the umbrella of this council, many subcommittees for specific industrial sectors have been set up. For different issues of industrial development, specialized committees have also been established. Representatives of the government—generally from the Ministry of International Trade and Industry (MITI)—enterprises, and academics participate in meetings of these organizations. Wada [45] states that the formulation and implementation of sectoral industrial policy during the rapid growth period was carried out through collaboration with companies and industrial associations, instead of strong government-led power. Many policies have been formulated as an outcome of the collaborative work of the government, enterprises, and sector associations. They share knowledge of issues and challenges of each sector and collaborate in the process of implementation of policies. Sectoral industrial policies are formulated based on the in-depth analysis of very distinct sector-specific challenges. In this regard, the case of the Act on Temporary Measures

for the Promotion of Machinery Industry could be among the most representative. For the automobile parts sector, 42 main parts (26 at the inception) were selected and rationalization plans for each of the parts were prepared through the collaboration of public and private sectors. The participation of many stakeholders made the process of formulation and implementation of plans very transparent. The policies implemented by this law (1956–1970) were successful due to the cooperation of the public and private sectors, as well as networks among firms working effectively ([32], pp. 14–15).

In Korea, where exports were one of the top priorities of industrial policy, export promotion meetings attended by President, high-ranking government officials, and business representatives functioned as an effective platform for public–private collaboration. Lim [26] states that 'these meetings provided a forum to monitor progress and devise institutional innovations and solutions to emerging problems' (76). Export insurance was one of many institutional innovations that were introduced as a result of recommendations from monthly export promotion meetings. Lim emphasizes that, 'most importantly, Korea adopted an integrated approach to export promotion, with comprehensive and interrelated measures, policies, and institutions' (76). Regarding public–private coordination, Lim concludes that;

> the government formulated indicative plans at the national level but delegated much of their implementation to business groups, which in turn tried to coordinate productive activities at the group level in addition to engaging in market transactions. Based on close public-private consultations and performance-based rewards, this two-tier approach to coordination helped to address information and incentive problems. [...] Korea maintained an outward-oriented, bottom-up, and integrated approach, relying on close public-private consultation and international benchmarking. While continuing to pursue export-oriented industrialization for its resource allocation, scale economies, and dynamic learning effects, the government and the *chaebol*[4] systematically studied what had to be done to fill the missing links in the domestic value chain and move up the quality ladder through technology acquisition, human resource development, and construction of optimal-scale plants aimed for the global market. ([26], p. 84)

Public and private collaboration through different types of partnerships provided a platform for learning about industrial policies due to the fact that government, public organizations, enterprises and their associations, and other stakeholders exchanged information and co-created innovative solutions. Learning, adaptation, and innovation are inherent in this process, as highlighted by Wada [45] in the case of Japan. Mainly due to public and private partnerships at different levels from deliberation councils to meetings of specific industry stakeholders, '[w]ith the presence of vertical bureaus, MITI was able to understand the actual activities of each specific industry, and was capable in formulating and implementing effective industrial policies suited to each case. On the other hand, Japanese companies formed business groups by industry, region, or function, and they tended to work together to solve common problems' (167). In-depth information on sector-specific idiosyncrasies was indispensable in formulating industrial policy measures appropriate for specific industrial

[4] A *chaebol* is a large family-owned industrial conglomerate with diversified affiliates in South Korea.

sectors. Wada [45] also refers to the viewpoint of the horizontal bureaus as follows: 'it was thought that gathering the real issues of each industry and considering them as an overall industrial policy from the viewpoint of the horizontal bureaus in MITI, effectively grounded Japanese industrial policy' (167).

Page, one of the authors of the World Bank [46] *The East Asian Miracle*, emphasizes the importance of formal deliberation councils established in five of the High Performing Asian Economies (HPAEs)—Hong Kong, Japan, Korea, Malaysia, and Singapore. He considers that they probably improved coordination among firms and the flow of information between businesses and government: 'Politically, they helped establish a shared commitment to growth and reduced rent-seeking. Information sharing made it harder for firms to carry special favors from the government and for government officials to grant special concessions' ([35], p. 49). He affirms that few Latin American economies have applied these lessons of institutional development. Based on experiences of these economies, Fernández-Arias et al. [10] state that, 'In some countries, such as Costa Rica, business is expected to be near the policy design process on matters that affect it directly. In others, such as Chile, government (especially high-level officers) keeps a distance. As a result, policies in Chile tend to be top-down, while policies in Costa Rica tend to follow a more participatory, bottom-up approach' (377).

2.5 Translative Adaptation and Local Learning: Insights from Country Experiences

The literature coincides on the importance of learning and enhancement of capabilities of governments, firms, and industrial human resources (workers, managers, and others) to be successful in industrial policy implementation, as well as in industrialization, as stated in Sect. 2.2. In this regard, the case studies of Sect. 2.3 revealed that the processes of learning, adaptation, and local innovation effectively took place in all 10 cases of transformative industrial development.

The processes are characterized by (i) attention to the uniqueness of each country and society, (ii) country ownership with the proactive roles of governments and private sector development, and (iii) process orientation through trial and error, and the establishment of systems that correspond to the stages of learning, adaptation, internalization, and scaling up. These are key ingredients of 'translative adaptation and effective local learning' identified in Chap. 1.

As summarized in the left-hand side column of Tables 2.2, 2.3, and 2.4, the countries were aware of their uniqueness from the perspective of the industrialization process, development of their respective industries, and endowment of knowledge/technology/capability and natural resources, as well as other idiosyncratic factors including geographic location.

Table 2.2 Steel industry: learning, adaptation, and innovation, and key ingredients of 'translative adaptation and effective local learning'

	Attention to the country's uniqueness	Country ownership (proactive roles of the government and the private sector)	Process orientation with trial and error (stages of learning, adaptation, internalization, and scaling-up)
Japan	Need to introduce cutting-edge technology as well as attain economies of scale, and import iron ore at lower cost	Steel industry rationalization plans addressing the country's uniqueness; long-term finance; eagerness of the private sector	Substantial improvement of technology; location of steel mills in coastal areas and introduction of iron ore carriers
Korea	Need to catch-up from scratch; need to play the role of one of the leading industries for HCI drive with linkages to other essential industries	Strong ownership of the country establishing POSCO with the President's leadership	Intensive learning through POSCO construction phase; improvement of absorbed technology
Brazil	Rich endowment of iron ore and technology of charcoal blast furnaces; need to introduce integrated steel plants and construct infrastructure for iron ore transport	Strong ownership of the country establishing CSN, USIMINAS, and other state steel plants, as well as CVRD; long-term finance by BNDES	Intensive learning of technology through USIMINAS construction phases and its dissemination to other state steel plants

Source Created by the author

In all cases, as concisely indicated in the central column of Tables 2.2, 2.3, and 2.4, ownership of the countries was conspicuous and the proactive roles of the governments were generally strong. Industrial policies to support development of the respective industries were comprehensive and generally effective as discussed in Sect. 2.4. In some cases, state-owned companies were established (to be privatized later), and in other cases, institutions or agencies were created to promote the development of specific industries.

A continuous process of learning, adaptation, internalization, and innovation took place, mainly through repeated trial and error, as summarized on the right-hand side of Tables 2.2, 2.3, and 2.4. At the advanced phases of the process, most of the countries achieved outstanding cutting-edge technologies, in many cases attaining innovative solutions to address the respective challenges they faced.

As mentioned above, three columns of Tables 2.2, 2.3, and 2.4 correspond to the three key ingredients of the process of 'translative adaptation and effective local learning,' as identified in Chap. 1. Therefore, the development of selected industries in the five countries could be considered cases of 'translative adaptation and effective local learning.'

Furthermore, we can identify some notable aspects of industrial policy that facilitated learning, adaptation, and innovation, as well as enhancing the capabilities of

Table 2.3 Automobile industry: learning, adaptation, and innovation, and key ingredients of 'translative adaptation and effective local learning'

	Attention to the country's uniqueness	Country ownership (proactive roles of the government and the private sector)	Process orientation with trial and error (stages of learning, adaptation, internalization, and scaling-up)
Japan	Need to attain higher quality and productivity for liberalization of imports and become competitive in international markets; develop supporting industry; address low quality roads and highways	Scheduled liberalization of automobile imports and foreign direct investment in car industries; supporting industry promoted by the Temporary Measures for the Promotion of Machinery Industry; 'K cars;' long-term finance	Introduction and continuous improvement of TQM and other *Kaizen*-based management approaches, later achieving higher productivity than other automobile industry countries
Korea	Need to develop the car industry from scratch, attaining scale economy (limited size of domestic market) through exports from early development phase	Ambitious long-term plan with targets of integrated production of national cars based on original models, parts production and assembly with competitiveness in exports	Intensive learning by Hyundai achieving scale economy and competitiveness for export
Malaysia	Need to promote car industry to create a broad industrial base and assist Malay workers and Bumiputra firms; need to achieve scale economy and higher level of local contents	Strong ownership of the country with a state-led 'national car' project to become a full-fledged car manufacturer; enhancing supporting industry through the Vendor Development Program	Great efforts of Proton to 'internalize core automotive capability;' development of around 300 car suppliers to provide about 5,000 parts and components

Source Created by the author

governments, firms, and industrial personnel from the above-mentioned case studies. The following aspects are among the most important.

First, the capacity for policy learning by governments was strengthened significantly through mutual learning between government and firms and other stakeholders involved in industrial development. The private sector also benefitted from mutual learning in this process. Deliberation councils were effective platforms for public–private mutual learning, and their importance was emphasized by the World Bank's *East Asian Miracle* study. The Industrial Structure Council and its affiliate committees in Japan, as well as export promotion meetings in Korea and Japan were well known examples. The government was able to understand the actual activities of each specific industry and was capable of formulating and implementing effective industrial policies through intensive learning among these platforms. In Brazil and Chile,

Table 2.4 Resource-based industries: learning, adaptation, and innovation, and key ingredients of 'translative adaptation and effective local learning'

	Attention to the country's uniqueness	Country ownership (proactive roles of the government and private sector)	Process orientation with trial and errors (stages of learning, adaptation, internalization, and scaling-up)
Malaysia: Palm oil industry	Need to establish competitive palm oil refining industry and produce higher value-added products	Strong ownership creating institutions to promote the industry: Palm Oil Research Institute and others	Leads worldwide R&D and innovation, and value chain of high value added products: detergents, medicines, and bio-diesel
Brazil: Grain and food value chain	Need to promote sustainable agriculture in the Cerrado and to develop Central west region	Strong ownership of the country establishing EMBRAPA, and providing long-term finance	Development of soil management and new crop varieties suited to tropical zones and their dissemination; continuous R&D and innovation
Chile: Forestry products industry	Possibility of developing competitive forestry production based on radiata pine trees	Strong ownership of the country establishing Forestry Institute for R&D, providing finance and several incentives, and discouraging export of raw wood	Development of higher value-added wood products and expansion of their exports, as one of the most important non-copper export segments
Chile: Salmon farming and processing industry	Possibility of developing competitive salmon farming due to favorable natural conditions	A public–private joint venture, Chile Foundation's investment in R&D and in a pioneering company to produce at scale	Improvement of salmon farming and processing technologies; establishing salmon value chain, and exporting processed products

Source Created by the author

some public entities such as BNDES and CORFO were crucial for these countries' policy learning and contributed to industrial development.

Second, in most of the above-mentioned cases, public or semi-public institutions for promotion of new industries and/or for their technological development (such as government agencies and departments, development banks, R&D institutions, industry associations, and chambers of commerce drawing from Andreoni [5]) were established. The case studies reveal that reasonably good institutional 'islands' can be highly effective when created for specific purposes, as distinct from an overhaul of the entire institutional structure. In particular, specialized institutions, with or without diverse incentives, achieved significant learning, adaptation, and innovation. For example, specialized R&D institutions carried out many indigenous learning

and innovation initiatives to address the distinct challenges that each country faced. They shared know-how and technology as a public good with private companies. This process substantially enhanced the productive capacity of newly established industries.

2.6 Concluding Remarks

As discussed in Sect. 2.2, in order to carry out a comparative analysis of industrial policies and industrialization among countries, it is necessary to classify both the industrial policy measures/instruments and the processes in which these policies are formulated and implemented. Bearing these classifications in mind, this chapter conducted case studies of the experiences of five countries from Asia and Latin America (Sect. 2.3). The development of the selected industries of these countries that contributed significantly to their transformation was not achieved in a laissez-faire market. In all cases, vertical (or selective) policies have been applied, in addition to horizontal policies applicable to all industrial sectors.

From the experiences of these countries, it is highly evident that what matters for industrial development is which combination of industrial policy instruments is appropriate in different circumstances, given sector-specific characteristics (sector-specific idiosyncrasies) and challenges, and how these policies are formulated and implemented. Regarding the combination of policy instruments, horizontal and vertical instruments have generally been complementary. Furthermore, horizontal policy instruments have not always been neutral for all industries. They have very often had stronger impacts on some sectors than others. On the other hand, as each industrial sector has its own specialties, a sectoral (vertical) industrial policy can respond to each sector closely and enhance the effectiveness of the industrial policy. Regarding the formulation and implementation of industrial policies, public–private partnerships are extremely important, as discussed in Sects. 2.2 and 2.4, based on recent literature and confirmed by the case studies.

The case studies of this chapter provide some valuable insights into the concept of the 'translative adaptation and effective local learning' discussed in Chap. 1. The case studies show that the countries were aware of their uniqueness from the perspective of the industrialization process, development of their respective industries, and endowment of knowledge/technology/capability and natural resources, as well as other idiosyncratic factors. Accordingly, industrial policies introduced by these countries were diverse because they were formulated taking into account their unique potential. This diversity could be considered compelling evidence of local learning and translative adaptation effectively advanced in these countries. Generally, in the process of developing the above-mentioned industries, public–private collaboration, through partnerships between the government, firms, their associations, research institutions, and other stakeholders, has been essential in learning, adaptation, and innovation. In this process, both policy learning and societal learning as well as adaptation—as emphasized in Chap. 1—took place. Public or semi-public institutions established

for promotion of new industries and/or for their technological development were highly effective in, for example, carrying out many indigenous innovation initiatives to address the distinct challenges that each country faced.

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Part II
Case Studies from Japan, Asia, Latin America, and Africa

Chapter 3
Japan's State Learning in the Meiji Period from the Vision Perspective

Kuniaki Amatsu

3.1 Introduction

This chapter analyzes the relationship between the reality of the industrialization vision launched by state leaders and policymakers and the state learning process in the early stage of Japan's industrialization. As explained in Chap. 1, translative adaptation in industrial policy proceeds through Vision, Strategy, Policy instrument, and Implementation stages (see Fig. 1.1). This chapter highlights the Vision stage, the formulation of which is the most upstream aspect that affects the development of strategy, concrete policy instruments, and decision-making in conjunction with state investment, positively and negatively. Here, industrialization vision is defined as the state view on industrial composition and key actors. These include such questions as what kinds of industries state leaders and government officials want to develop in the country in the future; what development paths they want to pursue to achieve industrialization; who they expect to lead industrialization—for example, the state vs. the private sector, or domestic vs. foreign investors; and what is the role of government [2].

Ohno [34, p. 84] states that development strategies that are not underpinned by the strong will and clear vision of state leaders are never successful. State leaders can include not only the country's highest decision-makers but also other key policymakers. Looking at examples of developing countries that are considered to be successful industrializers post-World War II, we can identify several countries and economies where the industrialization vision was actually set out by them and the industrialization process was led by them. In the case of South Korea, these were Park Chung-hee and O Won-chol; in the case of Taiwan, Yin Chung-jung (K. Y. Yin) and Li Kwoh-ting; and in the case of Singapore, Goh Keng Swee played such

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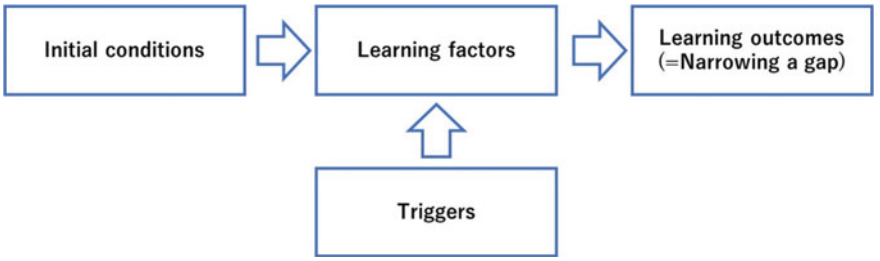

Fig. 3.1 Preliminary thoughts on the initial conditions, learning factors, and triggers in the learning of the vision formulation and policymaking practices (*Source* Author. Modified Diagram 5.2 of Amatsu [3])

roles. In contrast, there are countries that have set out a vision of industrialization and seriously promoted industrialization on the basis of that vision but have failed to industrialize or have fallen into prolonged stagnation. As Lin [22] claims, many political leaders have pursued their stated goals with benevolent and noble intentions, but finally failed to industrialize. He cited Mao's China, Nehru's India, Nasser's Egypt, and Nkrumah's Ghana as specific examples. Meanwhile, as long as a vision is a vision, it is inevitable that the direction and target level of industrialization that the vision aims for will diverge from the actual situation of the industrial sector when countries first launch their visions. In this chapter, this divergence will henceforth be simply described as a 'gap,' and it will be assumed that successful industrializing countries are those that achieved gap reduction in the early stages of industrialization, while unsuccessful countries are those that failed to do so and, as a result, left a serious mark on the subsequent industrialization process.[1] Then, whether a country is able to achieve gap reduction is considered as a difference in state capability, and the reduction process as the state learning process. The question is what was different between successful and unsuccessful industrializing countries in their state learning processes.

The analysis of this chapter is based on the experience of Japan from the end of the Edo to the middle of the Meiji period[2] (the end of Edo-Meiji hereafter) in the nineteenth century. What vision of industrialization was formed in Japan at that time, and did gaps arise? If so, how did these narrow during the process of industrialization? What were the factors that led to narrowing these gaps? These questions are argued with the framework developed by Amatsu [3] in mind, which explains the relationship among the initial conditions, learning factors, triggers, and outcomes of state learning, assuming that narrowing a gap is the key state learning process (Fig. 3.1).

[1] One size does not fit all. Thus, there are countries which do not fall into that category.

[2] Japan has its own year system separated from the western-styled 'year.' The periods are usually called either 'era' or 'period' in English. The word 'period' is used in this chapter. 'Meiji' is a period that started in Meiji 1 (1868) and ended in Meiji 45 (1912), while Edo is not strictly a period but the name characterizing the substantive rulers. Both year and Meiji are sometimes written together in this chapter because the style of 'Meiji xx' is convenient for understanding what happened at any point since Meiji 1.

This framework assumes that learning outcomes are affected by three variables, that is, initial conditions, learning factors, and triggers. The initial conditions are found in the situation before the industrialization process starts and would affect the state learning process. The learning factors and triggers influence the process of narrowing one or more of the gaps. The former can be controlled within the government, and the latter are those that cannot be controlled within government. Whether those factors work at what time and to what effect is an important key for narrowing any gaps [2].

3.2 Why Does Japan's Experience Matter?

There are two periods in Japan in which the industrialization vision is considered to have played a particularly important role: (i) post-World War II, and (ii) the end of Edo-Meiji period. In post-war Japan, the Ministry of International Trade and Industry (MITI) played a central role in vision formulation. The visions were published as official government documents and were revised in response to changes in the policy agenda. Each vision depicted a leading industry characterizing each decade: heavy and chemical industrialization in the 1960s, knowledge-intensive industrialization[3] in the 1970s, creative knowledge intensification[4] in the 1980s, and transformation of economic development model from production-centered to quality consumer lifestyles in the 1990s. The visions served to facilitate consensus building within the government and between government and the business sector [32, 38].

The end of Edo-Meiji was the period when Japan entered the modern era and, out of necessity, pushed ahead with modern industrialization for the sake of enriching the country and strengthening the military. Unlike post-war Japan, there were no government official documents outlining a vision for industrialization, but a vision was formed by state leaders. The industrialization efforts under the vision were a process of repeated trial and error, but the Industrial Revolution was achieved in two stages in just around 40 years after the opening of the country and its ports, first in light industry and then in heavy industry, and the establishment of modern industry was ensured.

From the perspective of the vision, the experiences in the end of the Edo-Meiji period would be more helpful for developing countries. Needless to say, the initial

[3] According to Odaka [32, p. 12], knowledge-intensive industry includes computers, industrial robots, integrated circuit, aircraft, telecommunication equipment, office equipment, numerically controlled machine tools, information processing service, software, and fashion-oriented industries (e.g., luxurious apparel and furniture, housing furnishings, audio visual devices).

[4] Odaka [32, p. 14] explains creative knowledge intensification as the vision that attempts to overcome the constraints of scarce natural resources, pursuing achievement of vitality and wellbeing simultaneously. To this end, MITI tried to realize new orientations of industrial structure to meet the four criteria, that is, dynamic comparative advantage, peoples' demand, energy-saving, and national security. This is industrial structure with an orientation of creative knowledge intensification. Biotechnology, new materials, new energy, and the fifth-generation computer were exemplified.

conditions in Japan then and in developing countries today are quite different. Meiji Japan was blessed. First, it inherited a legacy of administrative structures, better social indicators, the development of indigenous industry and its technological basis, experience of a market economy, and capital accumulation from the early modern period. Second, the homogeneity of national ethnicity was relatively high and there was no experience of specific sectors of the economy being dominated by foreigners. As a result, it was relatively easy to form a national consensus on the urgent need for and direction of industrialization. Many of today's developing countries not only lack these favorable initial conditions at the start of their attempts at industrialization, but also need to struggle for industrialization in the new context of increasing globalization, the penetration of cheap products from China and other less developed industrial countries into their domestic markets, and digitalization.

Nevertheless, it is worthwhile to summarize the Japanese case as a reference for industrialization in developing countries for the following reasons. First, the Japanese experience is a model of industrialization in a catch-up context. Second, Japan did not have a modern industrial sector until it started industrializing in the late nineteenth century. The contrast between before and after modern industrialization is relatively clear and therefore easy to analyze as a benchmark.

Based on this recognition, the remaining sections are organized as follows. Section 3.3 reviews the evolution of the industrialization vision from the end of Edo-Meiji period. Section 3.4 analyzes the process of narrowing the gap and discusses which learning factors and triggers were activated at what time and to what effect. Finally, Sect. 3.5 concludes by summarizing the implications of the Meiji Japanese experience for developing countries today.

3.3 The Experience of Meiji Japan in Vision Formulation and Learning

The end of the Edo-Meiji period in this chapter covered a period of around 30 years. The functioning of the learning factors, triggers and their impact varies from period to period. To capture them clearly, this chapter follows Oe [33] and Amatsu [3] and discusses Japan during this period by dividing it into three eras: the Ministry of Engineering (MOE) era (before Meiji to Meiji 6, 1868–1873),[5] the Ministry of Home Affairs (MOHA) era (Meiji 6 to Meiji 13, 1873–1880), and the Ministry of Agriculture and Commerce (MOAC) era (Meiji 14 to Meiji 30, 1881–1897).

[5] MOE was established in 1870 (Meiji 3); but for the sake of convenience, the MOE era also includes the end of the Edo period. The modern industrialization process started at the end of the Edo period, and the Ministry of Popular Affairs (MOPA) and the Ministry of Finance (MOF) were still in charge until the establishment of MOE. Therefore, more strictly speaking, the period should be referred to as the end of the Edo, MOPA, MOF, and MOE eras; but for the sake of simplicity, it is referred to as the MOE era. The MOHA period is defined as the period from 1873 (Meiji 6) to 1880 (Meiji 13), during which the MOE continued to exist until it was abolished in 1885 (Meiji 18).

3.3.1 Ministry of Engineering Era (1868–1873)

3.3.1.1 Industrialization Vision: Forming an Initial Version

In the end of Edo and the early Meiji period, visits to Western countries and study abroad trips had a major influence on the formation of the initial version of the industrialization vision. Among these, the trip by the Tyōsyū Five to the United Kingdom (UK) is particularly famous. At the time, Japan was in the process of transitioning from national isolation to opening up to the outside world, and a storm of anti-foreign government movements was raging. Five young men from the Tyōsyū clan—Inoue Kaoru, Ito Hirobumi, Yamao Yozo, Inoue Masaru, and Endo Kinsuke—were believers in the principle of that movement, but they felt that to realize exclusion they needed to know the other side first. So, they travelled to the UK to study naval affairs. They were surprised to find themselves that in Shanghai, where they stopped, and in London, where they arrived after a long voyage, there were many ships anchored in the harbor, brick buildings lining the streets, modern factories and smoke rising from chimneys, and steam locomotives running in the distance [27, pp. 248–261]. The difference in state power between Japan and the Western countries was astonishing, and they realized that exclusion of Western countries was not realistic, while opening Japan and its ports, and modern industrialization, were of great importance. Many Japanese who saw the Western countries during this period must have felt the same way.

On his return to Japan, Inoue Kaoru formed the Enlightenment group together with Okuma Shigenobu and others.[6] After the MOE was established in leap October 1870 (Meiji 3), he continued to play a leading role in the early policy of industrialization, the so-called *Syokusan-kōgyō*. From the outset, MOE was dominated by people who had been abroad. They are thought to have been influential in policy as possessors of Western knowledge. Inevitably, the aim was to replicate the model of Western countries [11, p. 245, 14, p. 25, 23, pp. 15–18]. The second was the establishment of new state-run factories (such as Akabane and Fukagawa Workshops). Loans were provided for industrial promotion [9, pp. 450–451]. However, such efforts during this period were not planned and were ad hoc in character [37, p. 241].

The industrialization vision that was formed can be roughly organized as follows. First, it envisaged the industrial composition which prioritizes the formation and development of those industries necessary for state building (bricks, cement, and glass), weapons and their materials necessary for a strong state (iron and steel making, shipbuilding), and major export industries (raw silk, mining industry). Secondly, it envisaged the industrializers as mainly state-run factories.[7]

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[6] Okuma Shigenobu did not experience such travel.

[7] Obata [31] argues that Inoue Kaoru and MOF put an emphasis on private-sector vitality (225–32). Harada [8, p. 129] also mentions the existence of a public interest perspective as a motive for the management of state-run model factories. However, considering that in pre-modern Japan, the private sector was engaged in the production of arts and crafts in each clan area throughout the country and commercial activities were widely conducted, it is unnatural to assume that Inoue

What the Meiji government actually did based on its vision was, first, the seizure or purchase of modern industries from the Tokugawa shogunate and clans (for example, the former were the military arsenals in Tokyo and Osaka, and shipyards in Yokosuka, Nagasaki, and Ishikawa-Jima, and the Hyogo Shipyard and Sakai Spinning Mills in the latter) [37, p. 241].

3.3.1.2 Industrialization Vision and the Reality in MOE Era

The initial version of the industrialization vision diverged significantly from the reality in several aspects. First, there was a divergence from the line-up of the real industrial sector [26]. At the time, Japan was an agricultural country and industry was mainly indigenous industry.[8] According to a prefectural survey of products conducted in 1874 (Meiji 7), alcoholic beverages and other food and beverage products, textiles and other clothing products accounted for an extremely large proportion of industrial output. Alcoholic beverages and textiles alone accounted for 32.3 % of total industrial output [39, pp. 13–16, 1, p. 295]. Secondly, there was a divergence between the industrial composition targeted by the industrialization vision and the main export and import products. According to MITI [23, p. 12], the main export products were raw silk, tea, copper, ceramics, and sea weeds, while the main import products were cotton yarn and sugar, with a high proportion of primary products in the composition between 1868 (Meiji 1) and 1880 (Meiji 13).

Third, the divergence was also observed in the establishment and operation of state-run model factories. According to Ishizuka [10, pp. 160–161], the financial performance between 1877 (Meiji 10) and 1885 (Meiji 18) of what became state-run factories in this period shows a deficit in the case of Hyogo Shipyard, Akabane Workshop, Senju Woolen Fabric Factory, and Tomioka Silk Mill.[9] The fact that this was the case during the MOHA era means that the earlier MOE era had insufficient capacity to operate modern industry. However, as Nagai [26, p. 211] argues, this chapter does not undervalue the technological contribution to the subsequent industrialization process made by state-run model factories.

The situation in individual industries also reveals the existence of a gap. In the case of cotton spinning industry, the first modern spinning factory in Japan was Kagoshima Spinning Mill, which started operations in 1867. This was followed by the Sakai Spinning Mill and the private Kashima Spinning Mill. The Kagoshima Spinning Mill was operated with the assistance of British engineers from Platt Brothers Co. Ltd, but after their withdrawal it was unable to operate technically and it consistently

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Kaoru, Okuma Shigenobu, and others were of the opinion that industrialization could be achieved solely through state initiatives, even though the times had changed in the Meiji period.

[8] According to Arisawa [6], based on a survey by the Ministry of Agriculture's Bureau of Engineering in 1909, *Administration of the Bureau of Engineering and its Policies*, indigenous industries included silk textiles, cotton textiles, sake brewing, zariyuki yarn making, Japanese paper, ceramics, lacquerware, cloisonne, flower mats, sanada (straw mats), and various other industries.

[9] Both the Hyogo Shipyard and the Akabane Workshop were founded by their predecessors in 1871 (Meiji 4) and renamed in 1877 (Meiji 10).

underperformed [16, pp. 38, 115–140]. These three initial spinning operations did not lead to the subsequent rise of the spinning industry and 'remained an episode that decorated the prehistory' [6, p. 32]. In the case of the silk reeling industry, exports to Europe had already increased rapidly in the end of the Edo period, but the rapid expansion of production created serious quality problems. The Tomioka Silk Mill was planned under the then Ministry of Popular Affairs in 1870 (Meiji 3) to standardize and improve quality through the introduction of machine-made silk, but it did not actually start operating until 1872 (Meiji 5). As for heavy industry, the iron and steel industry was only established in 1873 (Meiji 6) when the Kamaishi Branch Office was established under MOE; so it cannot be said that there was anything worth seeing at this time. In military-related industries, the military arsenals played an important role in terms of technology formation, but as they cannot be discussed in the same breath as other industries, this chapter will not go into depth in discussing their contribution.

The fact that modern industrialization was at a very early stage can be seen from the exhibits at the World Expositions and national expositions. The main exhibits were raw silk, minerals, flora and fauna, arts and crafts; there were no modern industrial products [20].

Against this backdrop, the era of MOE came to an end. What prompted the transition to the next era was the resignation of Inoue Kaoru, who had been the driving force behind the early industrialization efforts. Also, the Iwakura Mission, which was dispatched at the end of the MOE era, marked a turning point in the correction of the industrialization vision for the next era. The Mission was sent for one year and nine months between 1871 (Meiji 4) and 1873 (Meiji 6), and involved a total of 108 people including 46 government officials.[10] According to the Mission records compiled by Kume Kunitake in 1878 (Meiji 11), during their visit to Western countries, the state leaders observed systems of state governance, economic management, industrial production, and education, and learnt that behind Western military power there existed a modern state and economic power driven by modern industry. They also formed an image of future Japanese state building and modern industrialization. At the same time, they finished their visit with the impression that 50 years had just passed since the Industrial Revolution began in the UK and 30–40 years since Prussia and Russia achieved industrialization and that it was by no means impossible for Japan to do the same.

[10] Some authors, such as Katsuda [15], gives the official members of the Mission as 48 and the number of accompanying persons as 54.

3.3.2 Ministry of Home Affairs Era (1873–1880)

3.3.2.1 How Was the Industrialization Vision Corrected?

Industrialization during the Home Ministry era was led by Okubo Toshimichi, who had joined the Iwakura Mission and learned what the wealthy and powerful in Britain had done [15, p. 49].When MOHA was established in 1873 (Meiji 6) after his return to Japan, Okubo was appointed Home Minister. Thereafter, he took the lead in the industrialization efforts of the country. He wrote a 'Proposal for Industrialization' (*Syokusan-kōgyō ni kansuru kengisyo*) in 1874 (Meiji 7), a 'Proposal for Determining the Terms of Reference of the Ministry' (*Honsyō zigyō no mokuteki wo sadamuru no gi*) in 1875 (Meiji 8), a 'Proposal on Nurturing the State Economic Power' (*Kokuhon baiyō ni kansuru kengisyo*), and a 'Proposal for the Public Administration Reform' (*Gyōsei kaikaku no kenpakusyo*) in 1876 (Meiji 9), and thus presented his vision for industrialization.

3.3.2.2 Revised Industrialization Vision

In Okubo's eyes, the situation in Japan at the time of 1874 (Meiji 7) was that the shape of the state and the institutions concerning the people's lives were gradually being put in place, but that with regard to industrialization, the results of efforts were not visible. The people's knowledge was not sufficiently open, and they were unable to respond to changing circumstances. As the people's temperament was frail, the government considered it necessary to actively guide them towards industrialization.[11] For in his eyes, even in 1876 (Meiji 9), the people's knowledge was still insufficient, private industry had not yet been promoted, domestic production had not increased, resulting in a continuing trade deficit, and the industries that had existed before modernization were beginning to decline.[12] There was also a reflection that industrialization during the MOE era was superficial [26, p. 180]. Given that other state leaders and policymakers expressed similar views, Okubo's views were average for the period.

The major differences between the revised industrialization vision and that of MOE were, firstly, that the direction of industrialization followed the previous path, but with an emphasis on a decrease in imports and an increase in exports. As a result, in terms of the industrial composition, emphasis was placed on the promotion of indigenous industries, which had previously been the main products in terms of exports but had been largely ignored. Secondly, and related to the first change, there was an increased emphasis on the encouragement of industrial activities led by the private sector [5, p. 95]. The reality was that the state-run model factories still played

[11] A Proposal for Industrialization written by Okubo Toshimichi in 1874 (Meiji 7).

[12] A Proposal for Determining the Terms of Reference of the Ministry of 1875 (Meiji 8), and A Proposal on Nurturing the State Economic Power of 1876 (Meiji 9).

a central role, but the addition to the vision was nevertheless significant. As for the government's stance, it remained as paternalistic as it had been during the MOE era.

Looking at the measures taken during the MOHA era, firstly, the operation of state-run factories from the time of MOE continued. Secondly, new state-run factories were established. These were the Shinagawa Glass Works (established in 1876, Meiji 9), the Shinmachi Waste Thread Factory (established in 1877, Meiji 10), and the Senju Woolen Fabric Factory (started operation in 1879, Meiji 12). Thirdly, government funds were allocated for industrial development programs led by prefectures. In terms of individual industries, in the cotton spinning industry, around 1877, the 2,000 Spindle Plan was promoted to prevent imports, and the Aichi and Hiroshima Spinning Mills were newly established under government management (however, the Hiroshima Spinning Mill was sold to the private sector before completion). 10 units of spinning machinery with 2,000 spindles were purchased with government funds and sold to private industrial entrepreneurs. Replacement payments were then made to them for the purchase of imported spinning [23]. For heavy industry, MOE established the Kamaishi Branch Office, which inherited facilities from the end of the Edo period. As for indigenous industry, it seems that measures were not actually implemented at the central level until around 1885 (Meiji 18) [6, 26, 28].

3.3.2.3 Revised Industrialization Vision and the Reality

It can be seen that the industrialization vision of the MOHA era also diverged from the actual situation in the industrial sector. First, the main export and import products were still mainly primary products, as was the case in the MOE era. Second, as already mentioned, the financial performance of state-run factories continued to be in deficit. Nevertheless, the number of silk mills that received technical guidance from the Tomioka Silk Mill amounted to 17 from 1874 (Meiji 7) to 1877 (Meiji 10), and the number of apprentice female workers accepted from various prefectures totaled 3,238 from 1874 (Meiji 7) to 1884 (Meiji 17) [35, pp. 253–254). Third, there was the failure of the state-led industrialization programs and projects such as the cotton spinning and iron and steel industries. Take the example of the 2,000 Spindle Plan. According to a cotton manufacturer:

> Our factories in various parts of the country were poorly capitalized, lacking in academia, and with the ill will to import 7 million yen of cotton yarn every year, we were so-called daredevil and patriotic, and at the time we left it to the government's guidance and plotted a grand task without measuring ourselves, and to this day, we have hardly advanced or retreated from it. Today, they are almost always in a state of retreat. [6, p. 35][13]

This reveals that there was a lack of understanding of the spinning industry among the government and manufacturers. In the iron and steel industry, a blast furnace was constructed in Kamaishi in 1880 (Meiji 13). It began operating in the same year, but a fire accident at the charcoal plant led to its shutdown within a short period of time.

[13] Originally published in Cotton Yarn *Syudankai* article, 1885 (Meiji 18).

It was not put into operation again, and Kamaishi was temporarily closed down in 1882 (Meiji 15).

The gap between the ideals and reality of the industrialization vision can be also observed in the exhibits at World Expositions and national industrial expositions. At the Philadelphia World Fair (1876, Meiji 9), the majority of exhibits were ceramics and other indigenous industrial products, while at the First National Industrial Exhibition (1877, Meiji 10), although the government positioned it as an industrial promotion event, only coal lumps dug out with a new type of machine and a *Garabō* (spinning machine) by Gaun Tacchi were exhibited. Other than that, there were many arts and crafts [20].

In response to this situation, Nagai [26, p. 210] described the state-run model factories during the Home Ministry era as a failure. The MOHA era came to an end with the assassination of Okubo Toshimichi in 1878 (Meiji 11). On the other hand, the period of MOHA was also a time of gradual change in the views of state leaders regarding the main actors of industrialization. It is true that the actual policy was state led with its model factories. However, when drawing up plans for the establishment of the Senju Woolen Fabric Factory, Okubo himself stated that the mill must be paid for by the private sector someday, therefore, the factory equipment and other costs should be spent, and that if possible, it should be designed to be simple as a facility, mainly for refining, so that there will be no obstacles to its further expansion by being transferred to the private sector later. It can be seen that Okubo assumed that the private sector would eventually take the lead in industrialization. Furthermore, in a 'Proposal for the Change of the Economic Policy' (*Keizai seisaku no henkō ni tuite*) written by Okuma Shigenobu in 1880 (Meiji 13), it was argued that state-run factories should be disposed of,[14] and in a 'Paper on the Fiscal Outlook' (*Zaisei kanki gairyaku*) written by Matsukata Masayoshi in the same year, the opinion was presented that what could be left to the private sector should be left to them. These led to the promulgation of a regulation for a Disposal of the State-run Factories (*Kōzyō haraisage gaisoku*) in 1880 (Meiji 13). However, the conditions for companies to pay down their factories were too strict, and no such disposal was made. In 1884 (Meiji 17), the regulation was repealed. However, there is no doubt that the idea of private sector-led industrialization became the default for state leaders and policymakers.

[14] According to a Proposal for Change of the Economic Policy written by Okuma Shigenobu in 1880 (Meiji 13), state-run factories were classified into three categories: (i) those which, due to the nature of the business, needed to be handled by the state (e.g., military and infrastructure-related); (ii) those which required advanced knowledge and were better handled by the state in terms of maintaining confidentiality (coin minting and note printing); and (iii) those which should have the private sector in charge, but as the private sector has not grown up, the state has been operating on a pilot basis.

3.3.3 Ministry of Agriculture and Commerce Era (1881–1897)

In 1881 (Meiji 14), the Ministry of Agriculture and Commerce (MOAC) was established, combining the industrialization policy functions of MOE and MOHA. At that time, no document was issued like the Proposal for Industrialization written by Okubo after assuming the post of Home Minister. From this comes the view that a new stage began at this time, departing from the initial stage of state-led industrialization [26, p. 202].

3.3.3.1 Industrialization Vision in the MOAC Era

It is believed that the vision remained virtually unchanged in terms of the industrial composition even after the MOAC era. Documents and records submitted by those active during the transitional period from MOHA to MOAC and after the beginning of the MOAC era show that they advocated the need to improve the trade balance and promote domestic industry but did not mention the future state of its industrial composition. This may be because there was de facto consensus on the need to form the industries necessary for building a modern state and enriching the country and strengthening the military, same as in the previous eras. However, several other changes could have been made. Firstly, the expected main actors of industrialization shifted from the state-run factories to the private sector. After a regulation for a disposal of the state-run factories was repealed in 1884 (Meiji 17), three successive rounds of actual disposal followed [17]. Second, the government's stance on industrialization shifted from direct to more indirect one. In 1880 (Meiji 13), Ito Hirobumi and Okuma Shigenobu jointly submitted a Proposal for the Establishment of MOAC, which critically stated that, under the policy of encouraging agriculture, commerce, and industry, the government has established state-run factories and interfered with private businesses by lending funds and creating model businesses, but they have unwittingly created competition with private business, thereby undermining their profits. Reflecting this view of state leaders, during the era of MOAC indirect methods were adopted, such as the recommendation to hold *Kyōsinkai*[15] and agricultural trade fairs, and the development of technological administration and patent systems, rather than the establishment of state-run model factories. Around 1885 (Meiji 18), support for indigenous industry was also provided.

[15] *Kyōsinkai* was a product-specific fair, which Matsukata Masayoshi learnt about at the occasion of his visit to the Paris World Fair in 1878 (Meiji 11). It was promptly introduced as a result of his recommendations after his return to Japan.

3.3.3.2 Revised Industrialization Vision and the Reality

The gap may be considered to have narrowed significantly during the MOAC era—especially in the middle of the Meiji period. This is also the result of the industrialization vision coming closer to the reality on the government side. First of all, it can be seen that the formation of the vision was not based on euphoria about how it should be, but on the reality. This can be confirmed through the statements of state leaders of the time. In his opening speech at the First High-level Meeting of the Agriculture, Commerce, and Industry in 1896 (Meiji 29), Vice-Minister of Agriculture and Commerce Kaneko Kentaro stated that while Japan had reached the stage of becoming an industrial nation, trade promotion was important and that Japan should export to Western countries raw silk, tea, and arts and crafts which were its own products and export its manufactured products to less developed Asian countries. The importance of improving quality was emphasized. There was no longer any idea of forcibly forming industries that did not exist in Japan as a matter of policy, but rather the logic of the direction of future industrialization was built on the basis of reality [24, pp. 16–26]. And as for the main actors of industrialization, the private sector became more important, both in name and in reality.

The narrowing of the gap is also the result of the development of the private sector side. The experience of two periods of the boom of private company establishment in the Meiji period led to progress in catching up with the direction and states set by the industrialization vision. In the cotton spinning industry, the success of the Osaka Cotton Spinning Company (Osaka Boseki), founded in 1882 (Meiji 15), saw the emergence of a movement to follow suit. According to MITI [23, p. 197], the size and production of spinning mills expanded rapidly after 1889 and 1890 (Meiji 22 and 23), for example, 76 (1887, Meiji 20), 215 (1889, Meiji 22), 353 (1891, Meiji 24), 381 (1893, Meiji 26), 580 (1895, Meiji 28), and 970 (1897, Meiji 30) in terms of number of spindles (unit: 1,000 pieces),and 23 (1887, Meiji 20), 67 (1889, Meiji 22), 144 (1891, Meiji 24), 214 (1893, Meiji 26), 366 (1895, Meiji 28), and 511 (1897, Meiji 30) in the volume of domestic production (unit: 1,000 pieces), while the volume of imports declined after the peak in 1889 (Meiji 22).

These developments brought about the first boom in company establishment, with a rapid increase in the establishment of private companies in other industries as well. In the silk reeling industry, the number of silk mills in the Suwa region reached the height of their prosperity in 1893 (Meiji 26). In the cotton textile industry, a hybrid business of cotton spinning and weaving emerged in 1888 (Meiji 21), and in 1889 (Meiji 22) the Osaka Boseki started cotton weaving on power looms. In the iron and steel industry, Tanaka Chobei took over the abandoned Kamaishi Mine in 1885 (Meiji 18) and established the Kamaishi Mine Tanaka Steel Works in 1886 (Meiji 19). In 1894 (Meiji 27), the company succeeded in making pig iron for the first time using domestically produced coke. In shipbuilding, Kawasaki Shozo added a shipyard in Hyogo in 1881 (Meiji 14). In 1887 (Meiji 20), Kawasaki and Mitsubishi took over the Hyogo Shipyard and Nagasaki Shipyard, respectively [6, pp. 72–77]. This boom was supported by the achievement of stability in the currency, the development of modern financial system, capital accumulation in the private sector, cheap labor,

a stimulus to motivation of company establishment due to good performance of existing companies, development of infrastructure (railways, marine transportation, postal service, roads, ports), development of a legal framework (bill of exchange, promissory note, trade mark, patent, etc.) [8, pp. 260–261].

As a result, the trade balance turned into surplus in 1882 (Meiji 15), and the target of decreasing imports and increasing exports was achieved. According to Yamazawa [40, pp. 248–249], in the case of cotton yarns, the situation in the Meiji period was such that imports were used to supplement domestic production that could not meet domestic demand. Later in the 1880s, while domestic demand rose sharply, domestic production also increased rapidly for example, 11,933 (1886, Meiji 19), 16,849 (1887, Meiji 20), 21,937 (1888, Meiji 21), 43,699 (1889, Meiji 22), and 64,242 (1890, Meiji 23) in terms of 1,000 Japanese yen. It began to surpass imports in 1889 (Meiji 22), and moved into a phase of declining imports around that time, for example, 19,366 (1886, Meiji 19), 26,144 (1887, Meiji 20), 37,258 (1888, Meiji 21), 33,683 (1889, Meiji 22), and 25,098 (1890, Meiji 23) in imports (unit: 1,000 Japanese yen). Cotton fabrics achieved an expansion of domestic demand and production in the mid to late 1880s, for example, 27,549 (1885, Meiji 18), 34,004 (1886, Meiji 19), 53,424 (1887, Meiji 20), 66,056 (1888, Meiji 21), and 74,494 (1889, Meiji 22) in domestic production and 42,716 (1885, Meiji 18), 46,184 (1886, Meiji 19), 71,918 (1887, Meiji 20), 86,314 (1888, Meiji 21), and 95,574 (1889, Meiji 22) in domestic demand (unit: 1,000 Japanese yen) [40, pp. 248–249].

The progress of the private sector in catching up with the industrialization vision can be seen in the exhibits at the World Exposition and the national industrial expositions. At the Third National Industrial Exhibition in 1890 (Meiji 23), shoes, machine-made silk, and copper products using Western technology were exhibited. At the Fourth National Industrial Exhibition in 1895 (Meiji 28), many electric machines were exhibited [20]. Then, less emphasis was placed on exhibiting at foreign expositions such as the World Exposition, and the Meiji government stopped participating in the World Exposition after Chicago in 1893 (Meiji 26) [23, p. 246]. According to MITI [23], by the late Meiji period (1901–1912), the government no longer referred to the word of *Syokusan-kōgyō* (456). This suggests that the gap had narrowed significantly.

During the eras of MOE and MOHA, state leaders played a central role in shaping the industrialization vision. And it was a time when their visions influenced private sector entrepreneurs. In contrast, such period came to an end in the MOAC era, when the competence of the private sector caught up with the status pursued in the vision, marking the beginning of an era in which the reality of the industrial sector influenced the formation of visions.

3.3.4 Comparison of the Three Eras

The transition of the industrialization vision can be summarized as in Table 3.1. For avoiding duplication, three points are highlighted here. First, the vision tended to be formulated based on the euphoria of state leaders, not the actual situation of the industrial sector initially. Then it came to be formulated based on the reality but experiencing a transition period of a hybrid of euphoria and reality-based vision formulation. As industrialization progressed, this gap was narrowed. Interestingly, the desired industrial composition did not appear to be changed dramatically, rather almost maintained through the three eras. Instead, the expected main actors of industrialization were changed along with the change of the intervention style by the government, shifting from a direct or paternalistic approach to a more indirect one.

3.4 Analysis of the Learning Process

We have reviewed the evolution of the industrialization vision and the process of narrowing the gap in three separate eras. What would be of interest today for latecomers is what learning factors and triggers worked in Japan, at what time, and what results were achieved in the early stages of industrialization.

Table 3.1 Evolution of the Industrialization Vision in the MOE, MOHA, and MOAC Eras

	MOE era (1868–1873)	MOHA era (1873–1880)	MOAC era (1881–1897)
Basis of vision formulation	Euphoria-based	Euphoria and reality-based	Reality-based
Gap	Large	Being reduced	Reduced more
Desired industrial composition	Development of those industries necessary for state building (bricks, cement, and glass), weapons and their materials necessary for a strong state (iron and steel making, shipbuilding), and major export industries (raw silk, mining industry)	Same as the left and indigenous industries	Same as the left
Main actors	State-run factories	Private sector, but substantially state-run factories	Private sector
Government stance and policy actions	Direct intervention through simple copy & paste	Direct intervention	Indirect intervention

Source Author

3.4.1 Learning Factors

To pass this information, we focus on several learning factors. The first factor was the intense interest and seriousness of state leaders and policymakers towards modern industrialization. In the case of Japan at the end of Edo-Meiji period, state leaders and policymakers did not have a background in modern industry. However, they were extremely serious about industrialization. This became the lead-off factor in the subsequent state learning process. State leaders and policymakers, including the Tyōsyū Five and the Iwakura Mission, went to the West and studied the systems in place there as stated previously. According to Ishizuki [11], 152 people studied in the United States, UK, France, the Netherlands, and other countries at the end of the Edo period, and 586 from 1868 (Meiji 1) to 1874 (Meiji 7) (141–42, 204). In addition, records were diligently taken at the Iwakura Mission [18] and others. These visits nurtured the passion for industrialization. According to Watanabe Kunitake, Okubo's life as a leader can be divided into two periods. The first was the period of building a unified modern state centered on the Meiji Emperor, and the second was the period after his return from the Iwakura Mission, when he worked diligently on *Syokusan-kōgyō* [15, pp. 805–806]. Trips to Western countries and study abroad were all financed with funds accumulated in the country. What would we call this situation without acknowledging that they were highly serious?

The second learning factor was the accumulation of industrial knowledge and skills within the government, in particular the formation of a pool of engineering technocrats. State leaders and policymakers in the Meiji period were keen to absorb and accumulate knowledge internally. As a result, it is thought that this led to the creation of a foundation for a deeper understanding of modern industry. According to the author's personal experience abroad, in developing countries in the early stages of industrialization, the private sector often complains that even if they want to discuss with a government, they cannot speak in a common language due to the lack of accumulated knowledge within the government, such as in a Ministry of Industry.

Recalling this, the efforts of Meiji Japan would have been important. Short-term efforts included, firstly, experiencing the manufacturing systems that Amsden [4] emphasized. At the end of the Edo period, the Satsuma and Saga clans actually built reverberatory furnaces and ships based on foreign language literature. In the case of the Satsuma clan, Godai Tomoatsu was ordered to buy spinning machinery. In the Meiji period, as already mentioned, the government led the construction and operation of state-run factories and supported the design of modern factory construction and the installation of modern machinery for private industrial entrepreneurs. For example, in the 2,000 Spindle Plan, Ishikawa Seiryu, who had been involved in the Kagoshima Spinning Mill, designed the mill and provided operational guidance for them, while the Akabane Workshop designed a prototype spinning machine at its request.

While the 2,000 Spindle Plan failed as a result of the exclusion of hired foreigners from the Plan because the government was concerned about starting up the Plan with only Japanese engineers [30, p. 201], it was hardly possible that experiencing

manufacturing did not contribute to an accumulation of a sense of industries within the government. Secondly, the opportunity of the World Exposition was utilized. At the Vienna World's Fair held in 1873 (Meiji 6), 28 government officials were among the 77 dispatched, and seven of the 28 were technical apprentices. These included those with experience in setting up and running operations in machine production of silk reeling mills, chemical, machinery, and shipbuilding factories [7, pp. 59–66].

In the medium to long term, the knowledge accumulation progressed within the government through the creation of its own system for producing engineering technocrats at the Engineering Institution, which was established in 1871 (Meiji 4) and later renamed as the Imperial College of Engineering. According to a Regulation on the Organization and its Management of the Engineering Institution revised in 1874 (Meiji 7), the Institution was under the jurisdiction of MOE and was a school for educating future engineering technocrats serving in MOE, and this policy was also inherited by the Imperial College of Engineering [21].

On the other hand, it would be premature to assume that the birth of the engineering technocrats and the internal accumulation of industrial knowledge and skills were the immediate result of the study abroad programs and the establishment of the Imperial College of Engineering. Firstly, according to Ishizuki [11], study abroad in the Meiji period can be divided into three: the first period (1868–1876, Meiji 1 to Meiji 9), the second period (from 1875, Meiji 8), and the third period (from 1882, Meiji 15). In the first period, the level of education received in study-abroad destinations was not specialized education, and the overwhelming majority of students were enrolled in secondary education or lower. Inevitably, the academic ability of those students who returned home was insufficient and the program was not effective. In the second period, study abroad to deepen specialization began to take place, but it was not until the mid-1890s that they returned home and began to play an active role in the real world [11, pp. 239–249, 271–277, 310].

With regard to the Imperial College of Engineering, the first 23 students of the College, including those enrolled in the Engineering Institutions, graduated from the College in 1879 (Meiji 12). Looking at the career paths of the graduates in the old Engineering College data (1931), it was around 1883 (Meiji 16) or 1884 (Meiji 17) that the first graduating class became professors at the Engineering College or engaged in business in the real world, after studying in the UK and other countries. A few joined MOAC as engineering technocrats [13, p. 68]. Nakaoka [29] argues that it was around 1892 (Meiji 25) that the graduates of the Imperial College returned to Japan from study abroad and their activities became prominent in the steel industry (28, 41). Thus there is inevitably a time lag between the start of efforts to accumulate industrial knowledge and skills and the actual formation of the pool of engineering technocrats. The year 1896 (Meiji 29), when Kaneko Kentaro delivered his speech relating to his view on industrialization in the First High-level Meeting of the Agriculture, Commerce, and Industry, may be interpreted as such a time.

The third learning factor is the high sensitivity of state leaders and policymakers to the error correction factor, which tells state leaders of the need and urgency to correct the course of their industrialization vision. Generally, the larger the gap, the more the error correction factor will be activated. This was the case in Meiji Japan

too. The first important error correction factor was the macroeconomic situation of budget deficits and trade imbalances [26, pp. 180–182]. The budget deficit problem existed in the background to the resignation of Inoue Kaoru and the end of his time at MOE. The same was the background to the addition of decrease in import and increase in export as one of the goals of industrialization during the Home Ministry era. As evidence of this, documents left behind by state leaders at the time frequently discussed these two imbalances. The fiscal deficit and trade balance problems had become so serious that even Okubo, a proponent of *Syokusan-kōgyō*, had no choice but to submit a Proposal for Public Administration Reform in 1876 (Meiji 9). This was also the problem that led to Okuma Shigenobu's Proposal for the Change of the Economic Policy and Matsukata Masayoshi's Paper on the Fiscal Outlook in 1880 (Meiji 13), which argued for the withdrawal of the government from its factories.

The second error correction factor is exposure to the market. The holding of World Expositions, national industrial expositions and *Kyōsinkai* made Meiji Japan aware of the quality and competitive position of its own technology and products in the international market [7, p. 28]. According to Kuni [19], the Meiji government was not aware of where and what industries existed in Japan when promoting its policy of industrialization and development. For this reason, it industrialized the national industrial expositions to grasp the actual situation of indigenous industries (176–78). Okubo himself, in the First National Industrial Exhibition, stated that:

> Generally speaking, our crafts are not exempt from these three diseases, and there is no end to the number of things that should be exported overseas but are not doing so well at present. We shall investigate in detail the quantity and quality of the various types of products, and the quality of the workmanship of the man-made products. We shall change what should be changed, count what should be counted, supplement the small to make the large, change the poor to make the good, and create the future benefits. [15, p. 521–23]

In one sense, this was an emphasis on friendly competition between producers, but it would also have forced the state leaders to see the difference between the future state laid out in their industrialization vision and the actual situation of the industrial sector.

A third factor to notice is the diversity of debates within the government. Although the Meiji period sometimes tends to be associated with an authoritarian image, it was also a time when a variety of debates were accepted. Even during the MOE and MOHA eras, arguments were made that did not necessarily coincide with the government's industrialization line at the time.

3.4.2 Triggers

Triggers that facilitated the learning process also played an important role. It is believed that this increased the effectiveness of the learning factors mentioned above and accelerated the pace of gap reduction. The first trigger was the fact that Meiji Japan was facing a crisis of state survival. It was exposed to military threats from Western countries, such as the Opium War in China, the Shimonoseki War, and

the Anglo-Satsuma War [36, p. 42, 8, pp. 10–13]. When the Iwakura Mission met Chancellor Bismarck in Prussia, they were advised that the Western powers would respect international law when it was in their interests but would resort to military means when it was to their detriment, and that in such circumstances, small countries had no choice but to promote their state power to be able to negotiate on an equal footing with the major powers [15, p. 52]. These factors led to the formation of a national consensus to promote modern industrialization and realize the policy of enriching the country and strengthening the military.

A second trigger was the presence of vigorous private industrial entrepreneurs. As they continued to formulate technologies, their emergence led to the recognition of their existence as a main actor for industrialization among state leaders and policy-makers. However, their presence as a trigger did not perform strongly from the early stages at the end of Edo-Meiji period. Harada [8, p. 267] argues that they gradually increased their presence and began to perform as triggers in the mid-Meiji period. This can be seen by tracing the evolution of the presence of private companies in each of the three time periods in this chapter. Some descriptions are duplicated with the previous parts, but we would trace them one by one in this context.

First, looking at the MOE era, there were the first three spinning mills in the cotton spinning industry, but this did not lead to the subsequent development of a modern spinning industry [6, p. 32]. In the case of the silk reeling industry, the Meiji government actually established the Tomioka Silk Mill in 1872 (Meiji 5). During the MOE era, the main export products and exhibits at the World Expositions were those of indigenous industries, and their presence was probably not sufficient to be recognized as a main actor in industrialization by state leaders.

During his time at MOHA, Okubo stated in a Proposal for Industrialization in 1874 (Meiji 7) that 'the people's power is still weak and their spirit is still weak…' Even in the discussions on the establishment of the Shinmachi Waste Thread Factory and the Senju Woolen Fabric Factory, it is difficult to say that he paid much attention to private industrial entrepreneurs. And this is not to mention the failure of the 2,000 Spindle Plan. However, it is also true that in this period, the growth of private industrial entrepreneurs as a main actor of industrialization came to be recognized, such as the discovery of local entrepreneurs by Okubo Toshimichi during his Tohoku visit in 1876 (Meiji 9). Around 1877 (Meiji 10), small machine silk reeling mills sprang up in various parts of the country under the influence of the Tomioka Silk Mill [6]. In terms of technological formation, the *Garabō* (spinning machine) was invented by Gaun Tacchi in 1877 (Meiji 10). Therefore, although the presence of private companies was not significant, it can be said that this was the period when they gradually started to operate as a trigger. It is believed that by the beginning of the MOAC era, the presence of private industrial entrepreneurs had grown sufficiently to make the government take notice.[16] As already noted, their activities increased in various industries. It is difficult to believe that the Meiji government at the time was still unaware of their potential as a main actor in industrialization.

[16] The Ministry of Trade and Industry [23, p. 192] expressed a similar view.

A third trigger was the active expression of diverse opinions outside the government. As an example, from 1879 (Meiji 12) to 1880 (Meiji 13), Taguchi Ukichi, an economic journalist, argued in the Tokyo Economic Journal that economic activities should be left to the private sector. Later, as mentioned above, in 1880 (Meiji 13), Okuma Shigenobu and Matsukata Masayoshi submitted proposals advocating the reduction of the state intervention in industrialization. Although it is difficult to prove a causal relationship between the two, it is quite possible that these growing voices outside the government also had some impact on the formation of the state leaders' vision [25, pp. 73–76].

3.5 Conclusions: Implications for Today's Developing Countries

The vision of industrialization formed by state leaders in the early stages will inevitably diverge from the actual situation in the industrial sector, as long as the vision is a vision. Gap reduction is the state learning process itself, and it is important to know at what point in the early stages of industrialization the learning factors and triggers, which are factors inside and outside the government, performed, and consequently at what point in time gap reduction is achieved. This chapter has examined the gap reduction process based on the experience of Meiji Japan. As a result, several points deserve special emphasis.[17]

First, the intense interest and seriousness of state leaders and policymakers are important. According to the experience of Meiji Japan, the industrialization vision is created based on euphoria of state leaders and policymakers initially. The second important point is the extent to which industrialization knowledge can be accumulated within the government. Such internal accumulation will lead to a deeper understanding of industrialization and industries among state leaders, and to the development of a more realistic vision.

Third, it is important not to overreach and cause economic collapse during the gestation period from the initiation of the government's learning process to its progress. The more ambitious the industrialization vision, the more the error correction factor tells state leaders and policymakers of the need and urgency to change the course of the vision. It is important that the level of their sensitivity to these signals is high. If the sensitivity is high, the vision will be corrected. However, if the sensitivity is not high, macroeconomic collapse will force industrialization to change course. The result will be a serious impact on the subsequent industrialization process, i.e., a prolonged stagnation of industrialization. It would be nice if economic rationality could operate as a decision-making measure to force state leaders to alter the course of their vision, but this is unlikely to be the case in the early stages of industrialization.

[17] This chapter mainly argues the importance of the efforts by the central government. Needless to say, it is important to cover industrialization efforts at prefectural and local level to be able to grasp the process involved in narrowing a gap more comprehensively.

Fourth, the learning process required to narrow the gap cannot progress solely through internal government efforts. By increasing the technological formation capacity of private industrial entrepreneurs and increasing their presence in the industrialization process, the government will turn their face to them as the main actor of industrialization. As industrialization progresses, the vision of state leaders and policymakers will be influenced by the reality of the industrial sector to shape their vision. For this reason, it is necessary to develop the private sector from the early stages of industrialization.

And, as Wada [38] argues, although not mentioned in this chapter, there is a particular environment that is necessary for the industrialization vision to play its role productively. It is important that private industrial entrepreneurs face the direction of the government. The vision cannot function effectively in a situation where private industrial entrepreneurs do not desperately need the government. In the case of Japan, modern industry was unknown to the private sector from the end of Edo-Meiji period up to the time of the first rise in company establishments. In addition, private industrial entrepreneurs had not built up sufficient power, both technologically and financially, to be able to play the role of industrializers. It was therefore a time when they needed the indication of future direction by the vision of state leaders.

The points highlighted in this chapter should not be seen as lessons solely limited to manufacturing-led industrialization. They are the very essence of the government's approach to industrial development and can be applied commonly whether the lead sector of economic development is agro-processing or digital innovation. On the other hand, it is not easy for developing countries in the early stages of industrialization to meet these requirements. How to proceed with industrialization without their fulfilment, or whether industrialization can proceed successfully even if these requirements are unfulfilled, is a future research agenda.

The experiences of Meiji Japan give useful insights to today's developing countries. At the same time, it also teaches us that state learning cannot be achieved by simply borrowing the model used in other countries and requires trial and error. The intensity of the interest and seriousness toward industrialization must be tested and that cannot be gifted by others in the learning process. According to Johnson [12, p. 326], 'the institutions of the Japanese developmental state are the products of Japanese innovation and experience. This suggests that other nations seeking to emulate Japan's achievement might be better advised to fabricate the institutions of their own development states from local materials.' Even today, these words never fade away.

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Chapter 4
National Movements for Quality and Productivity Improvement with Local Adaptation: The Experience of Japan and Singapore

Izumi Ohno and Getahun Tadesse Mekonen

4.1 Introduction

Japan and Singapore have successfully learned foreign management technologies to improve quality and productivity, with local adaptation, and promoted them as a national movement [18, 20, 33]. Such national movements contributed to helping the industry and business of both countries productive and competitive in international markets in the late twentieth century [8]. What were the concrete mechanisms and factors that enabled Japan and Singapore to initiate, localize, and sustain such national movements? This is the central theme of this chapter.

After World War II (WWII), Japan learned productivity movement and quality control (QC) methods from the United States (US) and developed these as its own management method. The adapted method—which came to be known as *Kaizen*[1]—emphasized a process orientation and participatory approach and spread rapidly

This chapter is based on the authors' published papers [18–20], with additional research and updated information. It also relies on the work by Kikuchi [14], Woon and Loo [32], and Yanagihara et al. [33].

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[1] *Kaizen* means 'continuous improvement' involving the entire workforce from the top management to middle managers and workers [21]. More specifically, *Kaizen* is an umbrella concept for a large number of Japanese business practices, such as 5S, suggestion systems, Quality Control Circle

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among Japanese companies. Subsequently, the Singaporean Prime Minister, Lee Kuan Yew, requested the Japanese government to introduce the Japanese model of quality and productivity movement to Singapore, and the Japan International Cooperation Agency (JICA) provided large-scale technical cooperation to the country throughout the 1980s. Learning from Japan, Singapore established its own institutional mechanisms for the productivity movement. Unlike the Japanese approach, which was led by the private sector, the Singaporean productivity movement was led by the government, and campaigns were promoted not only in the business sector but also in the public sector, linked with a civil service reform program.

The experiences of the two countries suggest the importance of 'translative adaptation' by latecomer countries when absorbing advanced knowledge and technologies in their catch-up processes, as emphasized in Chap. 1 of this book. This also shows the process of the diffusion of learning from the US to Japan, and then to Singapore.

National movements are nationwide engagements involving the entire population for a decade or more, to transform the popular mindset toward hard work, teamwork, and creativity [18]. Particularly, the movement for quality and productivity improvement requires a national effort by many public and private stakeholders to attain economic and social progress, involving the active participation of business, industry, workers, government, academia, community groups, and other interested parties [23]. In a sense, this can be seen as one way of creating a 'learning society' as emphasized by Stiglitz and Greenwald [27]. To be successful, these movements require a self-sustaining system of principles, implementing mechanisms, and necessary resources backed by strong passion and deep commitment, involving everyone from top to bottom in a society.

This chapter attempts to address the question of *how*, with special attention to the experience of Japan and Singapore. Following this introductory section, the second and third sections report on case studies of the Japanese and Singaporean experience with national movements for quality and productivity improvement. Special attention is given to the processes of how the two countries learned foreign models and developed locally owned practices and institutional mechanisms for their diffusion. The fourth section briefly explains the chain of local learning and diffusion of quality and productivity improvements in Japan, Asia, and beyond. The final section discusses key factors for successful design and implementation of national movements based on their experience and analyzes their implications for today's developing countries.

(QCC), Total Quality Management (TQM), Toyota Production System (TPS), and Total Productive Management (TPM), and so on.

4.2 Japan: The Experience of a Private Sector-Led National Movement

In Japan, national efforts to learn foreign production management technologies for industrial drive can be traced back to the pre-World War I time when American Scientific Management methods were introduced in the early 1900s. Celebrated books such as *The Principles of Scientific Management* by F. W. Tailor [29] and *Motion Study* by F. Gilbreth [3] were translated into various forms, studied, and practiced enthusiastically among both academic and business circles. This was the time when Japan was striving to strengthen its national industrial capacity as well as military power. Based on decades of accumulated experience, the US-originated Scientific Management method evolved into the Japanese Way of Efficiency (*Noritsu Do*), which pays greater attention to the human element [30].

During WWII Japan had only limited access to external resources including foreign technologies [24], and the government and the military promoted economic mobilization and rationalization, especially in iron and steel, and munitions (e.g., aircraft and shipbuilding) industries. Efficiency improvement in these industries became a high priority, and it was within this context that the Japan Management Association (JMA) and the predecessor of the Union of Japanese Scientists and Engineers (JUSE) were asked to support these industries [1, 4].

Then, WWII came to an end. Japan surrendered and completely lost its production capacity. Japan's national movement for quality and productivity improvement was then driven by a sense of urgency for post-war economic recovery and industrial catch-up. The WWII devastation made it difficult for both the government and business sectors to improve the quality and productivity for exporting processed products. At that time, 'Made-in-Japan' was perceived to mean 'low-price and low-quality,' and quality and productivity improvement was high on the national agenda. Japanese business and government leaders were eager to learn the quality control (QC) methods developed in the US, as well as the harmonious labor-management relations promoted by the British Productivity Council at that time.[2]

According to Sasaki [25], there were three paths that postwar Japan used to introduce and diffuse foreign management technologies to Japanese companies. The first path was through the General Headquarters (GHQ) of the Supreme Commander of Allied Powers (SCAP), which assumed responsibility for implementing policy in occupied Japan including economic democratization.[3] The US government and GHQ introduced American management methods, primarily through Japanese consulting organizations such as JMA and JUSE [25]. The second path was the Japan Productivity Center (JPC), which was established in the 1950s, inspired by the productivity movement that had been promoted in Europe by the US as part of the Marshall Plan.

[2] Also, throughout the second half of the 1940s and 1950s, the Japanese labor movement was ideologically leftist and radical, and there was an acute need to introduce cooperative labor-management relations in the economy [23, 26].

[3] GHQ continued its mandate until the Treaty of San Francisco came into effect on April 28, 1952.

The third path was direct technology transfer by individual Japanese companies from the 1950s. The following section will explain the first and second paths, focusing on the role of private organizations. The third path will be briefly discussed in Sect. 4.4.

4.2.1 Leadership and the Role of Core Organizations

In Japan, the private sector took the initiative to create the core organizations responsible for introducing, adapting, and promoting methods for improving quality and productivity. According to Kikuchi [14], three non-profit, private organizations spearheaded this initiative—JMA, JUSE, and JPC. These organizations facilitated learning, adjusting foreign models to Japanese reality, and dissemination of the modified model to all firms.

The three organizations have different histories. JMA is the oldest among them (established in 1942), dating back to the wartime period. JMA used to be a quasi-governmental organization under the control of the Ministry of Commerce and Industry, but after the end of WWII, it became an independent private organization performing consulting activities. JMA contributed to driving the movement of '*Noritsu*' in Japanese industry. A Japanese word, '*Noritsu*' means to optimize efficiently the ability of people, the full capacity of equipment and technology, as well as the functionality of industrial materials.[4] JUSE was created immediately after WWII (in 1946), succeeding several technology associations that were established in the prewar and wartime periods.[5] JUSE contributed to quality improvement in Japan, with greater emphasis on the transfer and diffusion of production management technology from an industry-wide perspective. JPC was established in 1955, with the influence of the productivity movement in the US and Europe. In this sense, the history of JPC is distinctive from JMA and JUSE, both of which had roots in the wartime period. JPC contributed to the development of productivity improvement movement from a macro-socioeconomic perspective. Table 4.1 summarizes the background for these private organizations.

As shown in Fig. 4.1, private organizations played active roles in three critical stages of technology transfer through learning, adaptation, and diffusion [14]. Top management of all three organizations had a strong sense of mission and commitment to developing companies and industries to realize Japan's postwar economic recovery. Their strong leadership was critical to introducing knowledge and technology from the US and Europe, adapting them, and diffusing quality and productivity improvement movements nationwide [14, 18, 33].

[4] See JMA homepage: https://www.jma.or.jp/en/about/group.html (accessed August 10, 2020).

[5] JUSE succeeded the wartime Greater Japan Technology Association (Dai Nippon Gizyutukai). This association was established in 1944 through the merger of the Industrial Policy Society (founded in 1918), the Japanese Association of Technology (founded in 1935), and the All Japan United Society for Science and Technology (founded in 1940).

Table 4.1 Core organizations for quality and productivity improvement

Japan Management Association (JMA)	• Established in 1942, as an incorporated association • Emphasis on *Noritsu* (efficiency) improvement, management innovation
Union of Japanese Scientists and Engineers (JUSE)	• Established in 1946, as an incorporated foundation • Emphasis on quality improvement ('Deming Prize,' QC Circle)
Japan Productivity Center (JPC)	• Established in 1955 as a public-interest foundation • Emphasis on productivity improvement (leading Productivity Movement). Tripartite collaboration among govt., business, and labor unions

Source Elaborated by the author, based on Kikuchi [14] and the websites of JMA, JUSE, and JPC

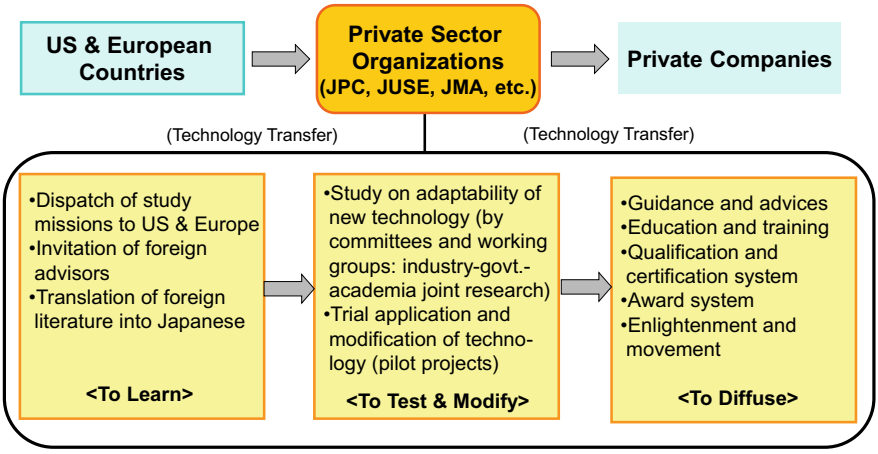

Fig. 4.1 The role of private sector organizations in introduction, development, and diffusion of foreign technologies (*Source* Elaborated by the author, based on Kikuchi [14])

The history of the establishment of the JPC exemplifies the strong commitment of visionary leaders of such private organizations. By the early 1950s, Europe was rapidly recovering from the devastation of WWII with US assistance (Marshall Plan) and embarking on a productivity movement based on collaboration between employers and workers. In 1951, Kohei Goshi, who was the executive director and later became the third chairman of JPC, visited Europe as a member of a Keizai Dōyūkai (Japan Association of Corporate Executives)[6] mission. He was convinced of the need for a productivity movement in Japan and thought that this issue must

[6] Keizai Dōyūkai is a private, non-profit, non-partisan organization that was formed in 1946 by 83 far-sighted business leaders united by a common desire to contribute to the reconstruction of the Japanese economy. Goshi was one of the founding members of Keizai Dōyūkai and served as Secretary General. Today the membership of Dōyūkai comprises approximately 1,400 top executives of some 900 large corporations.

be broadly shared with the entire business sector. Upon his return, Goshi invited major business organizations (e.g., the Japan Federation of Economic Organizations [Keidanren], the Japan Federation of Employers' Association [Nikkeiren], and the Japanese Chamber of Commerce) to collaborate in the establishment of JPC.

The Japanese government had also recognized the need for productivity improvement. In 1954, the Cabinet adopted a policy for productivity improvement. The Enterprise Bureau of the Ministry of International Trade and Industry (MITI) planned to set up a productivity organization. However, business leaders insisted that JPC be created as a private organization. Finally, the JPC was established in March 1955, funded by both public and private sectors, on the premise that the government would not intervene in JPC's spending policies and personnel affairs. A government-business coordination committee was established in May 1955, attended by vice ministers of various ministries and the JPC-selected private sector members. The coordination committee was chaired by a private sector representative. Importantly, the first coordination committee meeting agreed on the following three guiding principles as the basic productivity philosophy: (i) In the long-run, improvement in productivity should increase employment; (ii) Labor and management must cooperate on an equal footing; and (iii) The benefits of improved productivity should be distributed fairly among management, labor, and consumers. There was no reference to 'rationalization' of the workforce in the guiding principles.

Another important aspect of JPC history is the participation of labor unions. After WWII, as part of GHQ/SCAP-led democratization policy, labor unions were established and labor movements became active in Japan. Initially, they were cautious about collaborating with JPC because workers were concerned about a possible layoff as the result of efficiency and productivity improvements. However, the above three guiding principles gained support from the Japanese Federation of Trade Unions (Sōdōmei), paving the way for its participation in JPC in September 1955 [10]. Gradually, other labor unions followed. In this way the tripartite governing structure of the JPC Board was formed, including representatives of industry, unions, and academia.

4.2.2 Analysis of the Three-Staged Process of Technology Transfer and Local Learning

4.2.2.1 Learning Stage

At the first stage of learning, many study missions were dispatched to the US and Europe. Also, foreign experts were invited for lectures. Mission reports and lecture notes were widely disseminated among the organization members. Foreign text books and materials were translated and distributed to companies and researchers, as well.

JUSE took the American method of statistical QC and developed it into a Japanese-style Quality Control Circle (QCC). In July 1950, Kenichi Koyanagi, Managing

Director of JUSE, took the initiative to invite W. D. Deming, a renowned American expert on statistical process control, to deliver lectures on quality control.[7] Deming held a series of lectures and seminars, teaching basic principles of statistical quality control to executives, managers, and engineers of Japanese industries. His transcript of the eight-day course on QC was compiled from stenographic records and distributed for a fee. The lectures inspired many participants, and JUSE immediately established 'the Deming Prize' in 1951, with the aim of rewarding Japanese companies for major advances in quality improvement. The awards ceremony is broadcasted every year in Japan on national television. In 1954, J. M. Juran, another American expert, was invited to give lectures on managing for quality. He also met with executives from 10 manufacturing companies. Juran emphasized the importance of quality control in the context of overall management and taught at training courses for Japanese top and middle management. This provided the basis of Company-wide Quality Control (CWQC), which JUSE started to introduce from the latter part of the 1950s.

During 1955–1961, JPC received support from the US government on various activities, such as sending study missions, inviting experts, collecting materials and information, and making movies about technologies.[8] Figure 4.2 shows the trend of overseas missions organized by JPC. The number of missions and participants increased steadily. Normally, industry, the government, academia, and labor unions formed a team and went overseas together. Also, missions by specialized group (such as top-management, industry-specific groups, small and medium-sized enterprises (SMEs), and labor unions) were dispatched. They came from key industries, which became drivers of Japanese high-economic growth in the subsequent years [33]. It is also important to note that SMEs participated actively in this endeavor.[9] Upon return, mission briefings were intensively organized to share the findings with those who did not go overseas. 170 volumes of Productivity Reports (1956–1966) were published, based on mission findings. It is well noted that even after US support ended in 1961, study missions continued, with more than 40 missions dispatched annually until 1965 (funded by JPC and participating companies). The total number of study missions and the participants amounted to 568 and 6,072 respectively [10].

These examples show eagerness and strong ownership of the Japanese private sector, policy makers, and academia to acquire foreign knowledge and technologies in the postwar period for industrial catch-up.

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[7] Deming was invited to Japan by the Economic and Science Section of the GHQ to advise the study on Japanese population census. Immediately after learning about Deming's visit to Japan, JUSE took the initiative to ask him to deliver lectures on quality control. As a result, the eight-day course materialized [25].

[8] The US support to Japan's postwar economic recovery was driven by a strategic objective of keeping Japan within the Western camp against Communism at the time of the Cold War. Therefore, for the US, it was important to prevent the radicalization of the Japanese labor movement [26].

[9] The SME Agency was established under MITI in 1948. A visiting consulting system was also established in 1952.

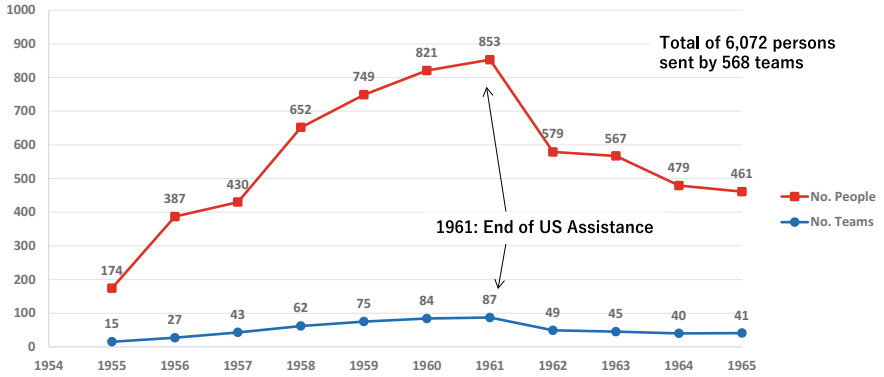

Fig. 4.2 Trend of study missions abroad by JPC (1955–1965) (*Source* Elaborated by the author, based on the information of JPC-SED [10])

4.2.2.2 Adaptation Stage

At the second stage (adaptation/internalization), various committees and working groups were established, comprised of experts and researchers from industry, government, and academia, to study the adaptability of foreign technologies and make necessary adjustments. In some cases, pilot projects were implemented at manufacturing sites to verify their adaptability and validity [14, p. 27]. So, the private organizations did not simply diffuse Western technologies in their original forms; foreign technologies were adapted to the Japanese context through self-study.

The QC Circle (QCC) movement initiated by JUSE is a good example of how the US-originated concept and techniques of statistical QC mentioned above have been adapted and disseminated nationwide. A QC Circle is a small group consisting of limited members (normally more than 3 and up to 10) working in the same place.[10] In Japan, supervisors act as team leaders. They identify causes of defective products and possibilities for improving products or production methods. The initial goals of QC Circle activities were to enhance management skills and leadership of supervisors and frontline workers, encourage all employers to participate in improvement activities, and implement company-wide QC Circle activities to achieve corporate goals and policies.

JUSE brought together leaders and experts from all of Japan's major industries and academia so that they could share their best practices. As a member of JUSE, Kaoru Ishikawa (Emeritus Professor of the University of Tokyo and Dean of the Musashi Institute of Technology) took initiative to introduce QC Circle activities in

[10] A QC Circle is defined by JUSE as '[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' [5].

1962 and actively promoted quality management technology in companies. He organized committees for research, development, and planning and served as the editorial committee chair of various magazines such as the 'Statistical Quality Control' and 'Gemba and QC Circle' (which was later renamed as FQC Magazine). From the early stages, Ishikawa recognized the need to disseminate Quality Control to front-line workers in the workplace. This was based on his belief that '[J]apanese workers are the best in the world with a superior level of educational standard and that [j]ust following the guidelines and manuals would make such people sick.' So, he suggested that we rather take advantage of their knowledge [12, p. 257]. He listened to the voices of foremen and understood their keen interest in learning quality management. After conducting deliberate discussions with the sub-committee and reviewing questionnaire surveys, he proposed Company-wide Quality Control (CWQC) involving front-line workers. This was quite different from the top-down approach that uses the ladder of office organization, often seen in the United States and in other countries.

The following remarks by Ishikawa at his special lecture at the 7th Quality Control Convention in 1969 exemplify how JUSE's basic principles reflect the Japanese way to quality improvement based on human-centered approach.

> When we started Quality Control in Japan, 20 years ago, we intended to start it with the Japanese way, as the background was different from Japan to that of overseas. Quality Control in the USA is quality control for professionals with a strong aspect of that for, so-called, QC engineers. On the other hand, there was no such professionalism in Japan, which is considered as pros and cons. As we believed that Quality Control with total participation was suitable for Japan, we promoted Quality Control for Top Management and Quality Management at the workplace. Quality Control in the workplace is performed just as a part of Company-wide Quality Control. More specifically, there is Quality Control by Top Management, also by managers, and by staff members. As a part of the chain, the workplace must carry out QC Circle activities in a responsible way. [12, p. 257]

To promote the QC Circle movement, JUSE created nationwide networks at the central and regional and prefectural levels. At the central level, in 1962, the QCC Center was established as a national registration system. Educational materials were developed and distributed through journals and field quality centers (FQC), providing a common framework for workers from different companies. FQC Magazine was a popular journal which started in 1962 as a quarterly publication and became a monthly in 1965. It contained information on case studies of QC Circles and served as an important channel of information sharing on QC Circle activities. Its price was set low (almost the same as the price of a pack of cigarettes) so that ordinary workers could afford it. One can call it as 'democratization of statistical methods' [1, p. 278]. In 1963, QCC Conventions began, at which diverse companies and circle members presented their problem-solving successes. Local chapters and regional branches of the QCC Center were also created.

Grass-root, local networks were at the heart of JUSE's QC Circle activities. There are nine regional branches (*shibu*) of the QCC Center (including the last, the Okinawa branch, established in 1984). According to the existing literature, regional branches had representatives from 10 companies on their management boards, who provided

free service to their regional branch in planning, organizing, and implementing various events [1]. As such, there existed the private sector's voluntary support to the functioning of the institutional infrastructure of QC Circles at the local level. In addition, local chapters (*chiku*) were established, largely coinciding with the prefecture level. It was at this chapter level of the QCC Center that much of the normal learning about circles and quality control took place. Each chapter has a senior executive from one of the member companies as its chairman, a board of counselors, and a coordinator who is often a university professor [1]. Chapter activities included running QCC Conventions (held throughout the country) and arranging for factory tour exchanges and various study meetings. The membership unit of the QCC Center was the local factories of national corporations. Large numbers of workers, including shop and office floor workers, were involved in these local-level activities. Through chapter activities, a feeling of solidarity and mutual development has been forged among workers across their companies. QC Circle activity was promoted by broadcasting training programs on radio/TV and publishing journals. In this way, JUSE successfully created mass organizations and networks for the QC Circle movement [1].[11]

In this way, the QC Circle activities initially introduced at the workshop level were developed into the nationwide QC Circle movement by the 1960s. The basic principles of QC Circle activities fully reveal human capabilities, respect for humanity and contribution to the improvement of company.[12] Similarly, JPC established seven Regional Productivity Centers during 1956–1960. While these Regional Productivity Centers were financially independent of JPC, seven chairpersons sit on the JPC Board and frequent liaison meetings were held to ensure coordination and cooperation. In parallel, Productivity Councils were set up at major cities.

To adapt and promote foreign technologies in the Japanese context, JPC created the Productivity Research Institute in 1956. The research institute published productivity statistics and conducted productivity-related research and surveys. Such research included studies on how to support productivity improvement of SMEs, which led to the formulation and dissemination of a 'cost-accounting' system for the use of SMEs. Training programs for SME management consultants were initiated. JPC also established four specialized organizations—the Japan Marketing Association, Japan Institute of Industrial Engineering (JIIE), Japan Consumers' Association, and Japan Packaging Institute—to study the validity and adaptability of new technologies and methods learned through overseas missions and explore possible ways of diffusion in Japan [33]. The membership of these organizations includes both the private sector and academia.

[11] Cole [1] discusses the details of grass-root activities planned and implemented by regional branches and local chapters. These activities involved not only experts, but also shop and office floor workers, and provided opportunities for sharing experiences and information across companies at particular localities.

[12] JUSE homepage: https://www.juse.or.jp/english/qc/ (accessed March 10, 2021).

JMA [9] also attaches paramount importance to the ability of people with virtual unlimited potential.[13] Such value has been inherited by the Way of Efficiency (*Noritsu Do*) advocated by Yoichi Ueno, a scholar in management and industrial psychology and founder of SANNO Institute of Management (established in 1925) and others.[14] In this sense, *Noritsu* is the Japanese adaptation of the scientific management method developed in the US. During WWII, JMA was a quasi-governmental body under the control of the Ministry of Commerce and Industry. But, after the end of the war, GHQ advised the Japanese government to withdraw all government funding. So, JMA decided to move toward an independent private organization performing consulting activities. JMA began to provide guidance to key industries designated by GHQ/SCP on a fee-basis—such as railways, communications equipment, mining—to increase production and process management. Such consulting activities were conducted with the knowledge and human resources accumulated prior to WWII [25]. JMA is also known for adapting Western maintenance management into Japanese-style Total Productive Maintenance (TPM). In 1961, a Plant Maintenance Committee was established within JMA, which subsequently developed into the Japan Institute for Plant Maintenance (JIPM) in 1981.[15] After in-depth research, JIPM proposed the concept of TPM, which is about plant maintenance with total participation of management and workers. It focuses on equipment and people, and a maintenance technique that improves productivity to achieve zero losses and reinforces production foundations.[16]

4.2.2.3 Diffusion Stage

At the third stage (scaling-up), various measures were mobilized for diffusing quality and productivity improvement management technologies in companies and developing the private sector capability for providing consultancy on practical productivity improvement methods and techniques. All three private organizations were actively engaged in implementing the following activities [14, 33]:

- Consulting services for guidance and advice;
- Education and training programs for companies to teach technical skills and methods;
- Qualification and certification systems;

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[13] See JMA homepage: https://www.jma.or.jp/en/about/pdf/pdf-pamph-en.pdf (accessed August 10, 2020).

[14] Yoichi Ueno and Toichiro Araki (a pioneer of professional business consultants in Japan) made invaluable contributions to diffusing the theory and practices of American Scientific Management in a Japanese way. Ueno keenly felt the deficiencies of American practices which narrowly focused on the material side of the principles of Taylor's Scientific Management and advocated a comprehensive set of principles of ordering human life as well as economic organizations as the Way of Efficiency (*Noritsu Do*).

[15] JIPM was established in 1981 through the reorganization of the Japan Institute of Plant Engineers (JIPE), which was created in 1969 as spin off from JMA 1961.

[16] JIPM homepage: https://jipmglobal.com/about (accessed August 10, 2020).

- Award systems;
- A nationwide campaign through award ceremonies, conventions, and seminars;
- Newsletters and publications.

Consulting services are a practical and effective form of technology transfer and diffusion. These services enable companies to acquire new management technology by solving specific problems and provide on-the-job training (OJT) opportunities. Especially, JMA has been known for its emphasis on consulting services since its creation in 1942. Mindful of fiscal independence from the Japanese government, JMA conducted its first fee-based factory analysis in January 1946. Factory analyses increased from 35 in 1946 to 44 in 1947 and 73 in 1948. Within JMA, a program to educate and certify consultants was also implemented. The number of consultants increased from 12 in 1946 to 55 in 1950 [25]. Subsequently, JMA established JMA Consultants Inc. (JMAC) in 1980 by converting its consulting division into an independent company. JMA's consulting approach includes tailor-made services and team work with clients and focuses on three changes: process change, mind change, and culture change.

JPC provides individual companies with consulting services on productivity improvement. It follows its own methods of *Kaizen* consultation, consisting of three components: resources, manpower, and facilities. Each component cross cuts sales, design, production, and procurement processes as deemed relevant. The main activities of JPC are training on managerial skills, management consultation, productivity research, issuing the Japan Quality Award, and engaging in international cooperation. JUSE has been involved in soft technology through which mathematical and statistical methods can be applied to corporate management.

Various training programs were provided on technical skills and methods. Training courses have been tailored to the level of each target group such as top executives, middle-ranking managers, and workers, with different training programs for different industries. JMA's training program incorporates human resource management by hierarchy (supervisors, middle, and top management), production process (lean production, TPM, TQM), management skills (plant management, balanced score card, ISO), and management skills by functions (R&D, production, procurement, supply chain management, office process improvement). Usually, JPC runs three-month courses for its management consulting training program. It prepares customized training courses for different levels of productivity facilitators. JUSE gives greater priorities to education and training than to consulting services for companies.

Qualification and certification systems have played an important role in developing private sector capability—particularly professional experts who are engaged in technology transfer—and maintaining their abilities above a higher level. Such systems contribute to increasing customers' trust in those professional experts, as well. Quality Control Specialist (JUSE), Management Consultant (JPC), and Certified Production Engineer (CPE) Qualification (JMA) are some examples of their qualification and certification systems. JUSE has been involved in global quality

affirmation, international conference for quality (ICQ), and international conventions on QC Circles (ICQCC).

The award system aims to recognize companies with outstanding performance in improving quality and productivity, or '*noritsu*,' in industry. The Deming Prize (JUSE), the Japan Quality Award (JPC), and the JMA Human Resources Development Excellence Award (JMA) are typical examples of this. The awards enable award-winning companies to improve their corporate image and reputation, and in turn motivate other companies to work hard for excellence. As such, the awards contribute to encouraging the broader adoption of good practices.

JUSE, JPC, and JMA all promote nationwide public relations/education activities. JUSE annually organizes the Deming Prize Award Ceremony during its Quality Improvement Month and creates slogans for nationwide quality improvement campaigns. It has published a great number of books on QC Circles, QC storylines, and Total Quality Control (TQC, Japanese *Kaizen*-based TQM). JPC has produced in-house publications that supported productivity facilitators and also issued 'declarations' whenever required. JMA has published various 'suggestions' to attract the interest of those working in industry and of the general public. All of them also publish various kinds of information, magazines, and newsletters. These include *Quality Management* (JUSE, monthly), *Productivity Newspaper* (JPC, weekly[17]), and *JMA Management Review* (JMA, monthly).

To raise the awareness of business managers, executives, production managers, and employees toward the improvement of quality, productivity, and efficiency, all three organizations hold conventions and symposiums to discuss specific themes. These events provide opportunities for successful companies to present their important achievements. Some of these conventions and symposiums are attended not only by company members but also by the general public.

4.2.3 The Role of Academia, Industry, and Government in Local Learning and Translative Adaptation Process

Collaboration and close interactions among academia, industry, and government have been a key feature throughout the process of local learning and translative adaptation in the Japanese quality and productivity movement. First, Japanese scholars made very important theoretical and practical contributions. They were actively involved in transferring and customizing management principles, tools, and systems as well as developing new ones. As explained before, Kaoru Ishikawa is a most exemplary figure. He is highly regarded as the 'founder of quality control in Japan' and the 'father of QC Circle.' Ishikawa worked in industry for eight years and returned to the University of Tokyo in 1947 where he graduated. He started studying statistical methods such as statistical quality controls and joined JUSE in 1949. Ishikawa played a key role in establishing an executive committee for QC conferences and sponsoring the

[17] Currently, JPC publishes the Productivity Newspaper three times per month.

conferences and initiating QC Circle activities in 1962. He was extensively engaged in QC consulting for all types of manufacturing industries and services [6]. Ishikawa is also known as the inventor of the Ishikawa Diagram, a cause and effect analysis diagram [5].

Second, there are a large number of well-known engineers and managers who promoted quality and productivity activities in many Japanese companies. It is fair to say that Japanese companies had personnel with sufficient educational background, technical knowledge, and enthusiasm to absorb foreign technologies and make them Japanese. Subsequently, many companies developed their own systems of *Kaizen*, including the globally known Toyota Production System (TPS) and *jishukanri* (self-management) activity in the steel industry. For example, Taiichi Ohno, ex-Vice President of Toyota Motor Company, is one of the most prominent industrial practitioners, known for his contributions to consolidating TPS. Taiichi Ohno graduated from the mechanical engineering department of Nagoya Technical High School in 1943, was hired by Toyota Corporation in February 1943, appointed as machine shop manager in 1946, promoted to director (1954), managing director (1964), senior managing director (1970), and executive vice president (1970) positions, and retired from Toyota in 1978. Ohno was the architect of the *Kanban* or just-in-time system that evolved out of the need to overcome certain restrictions in the marketplace that required the production of small quantities and many varieties under the condition of low demand, at a higher quality, lower cost and based on customer preferences [22]. Taiichi Ohno's focus was mainly on *Gemba* improvement activities at the workshop floor level. He is also known for coining the concepts of *Muda*, *Mura*, and *Muri* and codifying the seven types of *Muda* commonly known as waste [13]. These efforts laid a solid foundation for establishing the Japanese production management system. Overall, Japanese companies have endeavored to train their workers and have developed in-house systems for quality and productivity improvement.

It is also important to note the role of industrial engineers, who have actively conducted training and consulting services to companies. These included Shigeo Shingo, a consultant for Toyota and Panasonic, among others. Shingo joined the JMA in 1945. He provided 79 rounds of consulting to Toyota from 1955 to 1980 focused on designing and training productivity courses for 3,000 technical personnel and contributed much to the development of TPS [13]. Another prominent engineer is Kunio Shirose, who joined JMA in 1960 after graduating from Hokkaido University with a degree in applied chemistry. Later in 1984, he moved to JIPM where he served as a director and advisor to many companies on plant maintenance. He is the author of 'TPM for Workshop Leaders' (1984), editor of the 'TPM Team Guide' in 1988, and a contributing author in the 'TPM Development Program' published in 1989.

Third, public policy played a supportive role. The Japanese government took a comprehensive approach to quality and productivity improvement. Various national systems were established to support quality and productivity improvement efforts by the private sector. These include:

- Standards system (JIS: Japan Industrial Standards, from 1949);

- Public research organizations (*kosetsushi*, or testing and research centers that meet the industrial needs of local communities);
- Export inspection system (1957);
- *Shindan* system (SME management consultants system),[18] and so on.

For example, when certifying products for the JIS label, not only the products themselves but also the factory's quality management systems and facilities are examined in light of whether they have enough capacity to meet the standards. Also, public research organizations (*kosetsushi*) conducted tests and inspections and provided technological information to local SMEs (prefectures and municipalities). An export inspection system was introduced to improve the quality of export products. On-site inspections were conducted annually by government organizations. As a result, the percentage of rejected products decreased, and product quality improved. Under the *shindan* system, advice was provided to SMEs on the adoption of scientific management methods and new technologies. A visiting consulting system was established in 1952. These systems were mutually reinforcing [14, 18].

4.3 Singapore: The Experience of the Government-Led National Movement

In contrast to Japan, Singapore's national productivity movement in the 1980s was led by the government. It was executed as top-down policy with the late Prime Minister Lee Kuan Yew as the principal promoter. Initial results were rolled out to a wide range of workplaces—in both the public and private sectors—through official agencies.

Singapore is the first country where JICA provided comprehensive technical cooperation—in a venture called the 'Productivity Development Project (PDP)'—to transfer Japan's know-how in quality and productivity improvement. This project was requested by the then Prime Minister Lee Kuan Yew to the Japanese government. With the Prime Minister's strong commitment and leadership, the Productivity Movement was launched in 1981. The JICA project supported a substantial part of this initiative by mobilizing Japanese experts during 1983–1990. Singapore successfully internalized, scaled up, and institutionalized the Productivity Movement. Based on this experience, by the 1990s Singapore came to offer technical cooperation for productivity improvement in developing countries.

[18] In Japanese, *shindan* means enterprise diagnostic and advice. It is a state-authorized and supported system or enterprise and provides advisory services targeted mainly at SMEs in both the manufacturing and services sectors of the economy. *Shindan-shi* is a specialist who diagnoses and gives advice to SMEs, concerning various management issues.

4.3.1 Leadership and the Role of Core Organizations

From the early days of independence, productivity was high on the agenda of the Singaporean government. The national productivity organization was first created as a Productivity Unit within the Economic Development Board (EDB) in 1964. Later, both employer groups and labor unions in Singapore jointly developed productivity improvement guidelines (The Charter for Industrial Progress), and the unit was formalized as the National Productivity Center (NPC) in 1967. Since then, national productivity organizations have evolved, according to the stages of development and the needs of the Singaporean economy (Table 4.2).

The NPC was upgraded to a separate agency, the National Productivity Board (NPB) in 1972. In 1981, the government launched the Productivity Movement, and the NPB was designated as the principal agency to implement this national productivity drive. Also, the NPB was appointed as the counterpart agency of the JICA-supported PDP with the aim of promoting the Productivity Movement and studying Japan's experience. Separately, the Singapore Productivity Association (SPA) was established in 1973 as an affiliated body of NPB to promote active involvement of organizations and individuals in the Productivity Movement and spread the idea of productivity and its techniques.

In 1996, the NPB was merged with the Singapore Institute of Standards and Industrial Research (SISIR), a standards board that handles quality standards, to

Table 4.2 History of productivity-related organizations

Period	Organization	Remarks
1964	Productivity Unit, Economic Development Board (EDB)	1965: Charter for Industrial Progress, Productivity Code of Practice
1967–1972	National Productivity Center (NPC) – Autonomously-run division under EDB	1971: Tripartite Interim Management Committee (to prepare NPB)
1972–1995	National Productivity Board (NPB) – Statutory body, initially affiliated with Ministry of Labor and later with Ministry of Trade and Industry (MTI)	1973–present: Singapore Productivity Association (SPA) 1981–1985: Awareness stage 1986–1988: Action stage 1989–1990s: Ownership stage
1996–2001	Productivity Standard Board (PSB) – Statutory body, affiliated with MTI	
2002–2018	Standards, Productivity and Innovation Board (SPRING) – Statutory body, affiliated with MTI	
2018–present	Enterprise Singapore (ESG) – Statutory body, affiliated with MTI (merged with Int'l Enterprise Singapore)	2018–present: SPA becoming independent as the national productivity champion

Source Elaborated by the author, based on the published information on EDB, NPB, PSB, SPRING, and ESG

become the Productivity and Standards Board (PSB). In 2002, the PSB spun off its service-providing division, changed its name to the Standards, Productivity and Innovation Board (SPRING) and shifted its focus to SME development. In April 2018, SPRING was merged with International Enterprise (IE) to form Enterprise Singapore (ESG). Based on such institutional evolution, since 2018, SPA has become an independent association as the national productivity champion.

Despite more than 15 years of efforts to enhance productivity, the leaders of Singapore felt that the country remained far behind in productivity development. In 1979, Prime Minister Lee Kuan Yew was concerned: 'Workers here were not as proud of or as skilled in their jobs compared to the Japanese or the Germans.'[19] In early 1981, he met key Japanese employers in Singapore to discuss practices, work attitudes, and productivity in Japan. Immediately, the Committee of Productivity was formed to study Japan's productivity movement and examine the issues of productivity improvement, work attitudes, and labor management relations. In June 1981, he met with Kohei Goshi, then JPC Chairman, and was strongly convinced of the need for a Productivity Movement. The Committee of Productivity compiled a report that emphasized the importance of 'human aspects' or mindset change and proposed the establishment of a high-level council to review productivity efforts and outline future strategy.

Based on this proposal, in September 1981, the National Productivity Council (NPC) was established as an oversight and policy coordination body for the Productivity Movement. NPC was chaired by the State Minister of Labor (from 1986, by the State Minister of Trade and Industry) with about 20 high-level representatives from government, employer groups, unions, and academia. The first action of NPC was to launch the Productivity Movement with NPB as the primary implementing agency. NPB was re-structured and expanded to carry out its mission of inculcating the concept of productivity in every man, woman, and child in Singapore [16].

In this process, the Singaporean government requested the Japanese government for bilateral cooperation for productivity improvement, and the JICA-supported PDP was implemented for seven years. A number of the JPC experts were dispatched by JICA and provided technical cooperation throughout the period.[20] Tripartite cooperation among the government, employers, and labor unions is a key institutional feature of Singapore's Productivity Movement. This was inspired by the Japanese productivity movement experience. As such, the Productivity Movement in Singapore was primarily a nationally driven initiative. The practices of Japanese FDI

[19] According to Low Choo Tuck, former Director of the Planning Division, SPRING Singapore, by the early 1980s, an increasingly tight labor market had driven up wages. Companies realized that to compete successfully, they must introduce better management systems and more importantly have good labor management relations and teamwork. Nevertheless, the state of labor-management relations then was fragile and there were many industrial disputes [31].

[20] The PDP's achievement included: (i) approximately 200 Singaporeans trained in Japan; (ii) about 4,000 Singaporeans receiving domestic training using materials developed in Singapore; (iii) a total of 200 Japanese experts serving as lecturers; (iv) Japanese experts and consultants who guided more than 200 companies in Singapore for productivity improvement; and (v) some 100 companies that adopted 5S with guidance from NPB [7].

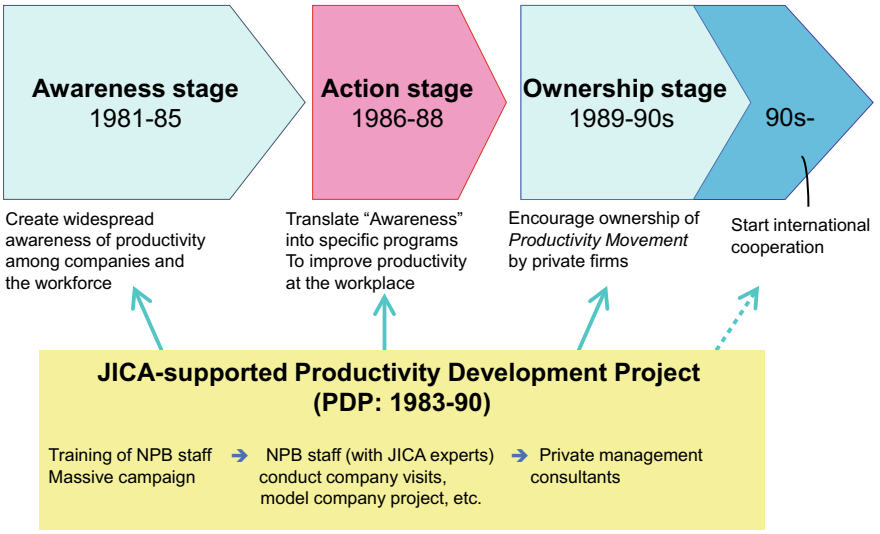

Fig. 4.3 Evolution of the productivity movement in Singapore (*Source* Ohno and Kitaw [19], based on the information provided by Mr. Lo Hock Meng [SPA] in September 2010)

companies operating in Singapore also served as important benchmarks for assessing Singapore's productivity level.

4.3.2 Analysis of Three-Stage Evolution of the Productivity Movement[21]

The Productivity Movement in Singapore evolved in three stages (see Fig. 4.3): (i) awareness stage (1981–1985); (ii) action stage (1986–1988); and (iii) ownership stage (1989–1990s). This categorization is based on the perspectives of the Singaporean counterparts who were involved in the JICA-supported PDP and is consistent with the three stages of local learning and translative adaptation explained in the Japanese experience of the above.

4.3.2.1 Awareness Stage

This first stage aimed at creating widespread awareness of productivity among companies and the workforce. The main focuses were to foster positive attitudes,

[21] This section is based on the author's interview with Low Hock Meng, then Executive Director of the Singaporean Productivity Association (SPA) and the information provided by him on September 2, 2010. Low was one of the counterparts of the JICA-supported PDP.

promote teamwork, and recognition for companies and individuals. Massive productivity campaigns were launched at both the national and company levels. November was designated as 'Productivity Month,' in which Lee Kuan Yew delivered annual speeches on productivity for seven consecutive year, beginning in 1981. More specifically, NPB took the following actions:

- Education of the public and massive campaigns;
- Information dissemination and training;
- Strengthening company identification;
- Promotion of labor-management joint consultation; and
- Promotion of productivity in the public sector.

Public education was prompted by the launch of the Productivity Movement, accompanied by the publication of productivity data, media support, and changes in schools and tertiary institutions. To disseminate the spirit of productivity to the public, the NPB created a mascot, named Teamy the Bee (a tiny, cute cartoon bee), which symbolizes hard work, team work, and efficiency. Productivity campaign slogans and posters were created, around the key message 'Together We Work Better.'[22]

Information dissemination and training were conducted in the form of courses that emphasize human relations, a library of local case studies on good management practices, and a registry of courses on productivity and management. To strengthen workers' identification with companies, various schemes were introduced such as payments of variable bonuses and special awards for long service employees. Furthermore, labor-management joint consultation was promoted through Work Excellence Committees (WECs)[23] and QC Circles.

Singapore introduced the Productivity Movement to both the business and public sectors, aimed at broader impacts on popular mindset change. It is particularly notable that Work Improvement Teams (WITs) were implemented in the public sector as part of the civil service reform program [15]. The public sector was the largest employer in Singapore at that time. A WIT is a group of civil servants from the same work unit, irrespective of divisional status, who meet regularly to solve problems, examine improvement opportunities, and develop problem solving skills. So, a WIT can be seen as a Singaporean adaptation of the Japanese-style QC Circle concept applied to its civil service needs. A productivity campaign was launched in the public sector as well, and the Productivity Working Committee was established

[22] This message was 'political.' Productivity improvement often invites workers resistance because they fear that efficiency gains from improved productivity might lead to unemployment. Mindful of such resistance, this slogan deliberately aimed at creating a virtuous cycle such that: increased productivity will promote growth of the business and economy, which should generate more consumer demand for products; this should bring satisfaction for individuals and more work for workers; and as a result, there will be welfare gains for individuals, including workers.

[23] WECs aimed to foster good labor-management relations within an organization, provide a platform to facilitate communication and consultation, study productivity challenges and discuss solutions, conduct annual surveys to access the morale and work attitudes of employees, drive the formation of QCCs to improve productivity, and organize social, cultural, and recreational activities to promote interactions between workers and management [32].

in the form of joint committee with management and workers. The Civil Service Institute provided various training courses to promote the WITs movement. WITs emphasized worker involvement, participation, and bottom-up management; team members worked together and focused on tackling problems facing their common work areas. While these features are common to QC approach, WITs had wider scope than QCs with their tools and techniques being geared more to service needs and applied to a variety of themes and projects (Ministry of Finance and Civil Service Institute 1982). They were not restricted to any specific level in the organizational hierarchy.[24]

4.3.2.2 Action Stage

At the action stage, the focus shifted from the national promotion of productivity to company-level promotion. This stage aimed at translating productivity 'awareness' into specific action at the workplace through participatory programs. It focused on upgrading the skills of management and workers, and the operational efficiency of companies. In 1986, NPB established a Management Guidance Center to administer various management consultancy programs for local companies [17]. Specific programs and activities implemented under the Center include:

- Model Company Project;
- Management Consultancy Referral Scheme;
- Associate Consultants Scheme;
- Industry-based Consultancy Assistance Scheme; and
- Training of Workforce through the Skills Development Fund (SDF).

The 'Model Company Project' was implemented jointly by the Japanese (JICA) experts and their NPB counterparts and provided assistance to companies. This paved the way for OJT of NPB staff to equip them with relevant skills. The 'Management Consultancy Referral Scheme' and the 'Associate Consultants Scheme' are the systems to mobilize those trained under the JICA project as 'qualified' private management consultants. NPB allowed private sector participation in the PDP training fellowship in Japan. Those trained became NPB Associate or Referral Consultants. A pool of over 200 associate and referral consultants was created to supplement NPB's efforts in reaching out to industries [17]. Furthermore, NPB introduced the 'Industry-based Assistance Scheme' in 1986. The scheme was designed to raise the level of productivity in six priority industries and assist companies on an industry-wide basis to impact productivity levels. These industries included food manufacturing, restaurants, hotels, retail, textiles and garment, and finance.

Under the Management Guidance Center, NPB assisted companies, particularly SMEs, in improving their business efficiency and productivity management. Cases

[24] According to the booklet from the Singaporean government, WIT meetings can be held during office hours or voluntary overtime.

of successful companies were highlighted to serve as models for the others. NPB also promoted the growth of management consultancy services for SMEs.[25]

Besides consultancy, a high priority was placed on productivity-related training programs, and companies were encouraged to send their staff for training. For example, NPB teamed up with reputable companies such as Singapore Airlines (Service Quality Center), Philips Singapore (Industrial Engineering Training Center), and Seiko Instruments (OJT Project) to develop national training programs in specific areas for managers and workers. Additionally, extensive trainings to enhance the skills of the workforce were conducted with support from the SDF.[26]

4.3.2.3 Ownership Stage

By 1989, companies and individuals had become actively involved in the Productivity Movement. So, the ownership stage aimed at self-sustaining the national movement to ensure that productivity habits form part of the work ethic. Private and public organizations and individuals are encouraged to lead the Productivity Movement. The government launched various initiatives to promote company-level productivity improvement, which include:

- Annual productivity campaign led by the private sector;
- Singapore Quality Award (1994–); and
- Productivity Activist Scheme (1996–).

For example, NPB promoted the private sector to lead annual productivity campaigns, and employer groups were urged to chair the Campaign Steering Committee. The Singapore Quality Award was introduced in 1994 and given to both private and public sector companies. The Productivity Activist Scheme was launched in 1996. This scheme aims to develop a network to enable member companies to benchmark their productivity against partners and improve their skills and techniques. Key activists (productivity 'champions') from the public and private sectors were introduced to lead, organize, and influence other members of the workforce in various productivity activities. Resources are pooled for an effective exchange of information in support of productivity improvement.

[25] Some 105 local companies have benefitted from assistance rendered by NPB consultants and Japanese experts, as well as the Associate and Referral Consultants [16].

[26] SDF was established in 1978 as employer-based funding that provides financial incentives for staff training. All employers must pay a Skills Development Levy for all workers, and the Central Provident Fund collects the levy. The levy collected is channeled into the SDF, which provides grants to companies that send their workers for training. While SDF was initially managed by the Ministry of Labor, from 1986 it came under the NPB's responsibility. Currently, the SDF is administered by the SkillsFuture Singapore Agency (SSG) under the Ministry of Education.

4.3.3 *Mechanisms for Stakeholder Engagement in the Productivity Movement*

To implement the Productivity Movement, the Singaporean government created a centralized oversight and coordination mechanism and reinforced the existing national productivity organization to perform such operational functions as public campaigns, training, consulting, research, measurement, and industrial relations. As Fig. 4.4 shows, the mechanism was built on strong involvement and support of tripartite key stakeholders (public sector, unions, and employers) to ensure that productivity gains be shared among these stakeholders. These institutional factors greatly contributed to the successful awareness raising and scaling-up of the Productivity Movement. This framework has provided channels for involving various groups and institutions and thus facilitated the scaling-up of the movement. Because Singapore is a city state, there was no need for a local-level coordination mechanism.

At the policy level, in 1981, as a tripartite council, NPC actively involved key stakeholders, annually reviewed productivity programs and outlined its future strategy. As such, NPC ensured national consensus on key productivity strategies and programs. At the operational level, NPB played a key role as the secretariat of the NPC, and also served as the operational arm spearheading the productivity campaign in both the public and private sectors throughout the three stages of the Productivity Movement. Under the oversight of NPC, NPB coordinated and promoted the diffusion of the Productivity Movement, such as productivity awareness, the improvement of skills connected to productivity management techniques and harmonious labor management relations, and so on. It also provided training and management consultancy, spread QC Circles, promoted the concept of productivity, and administered

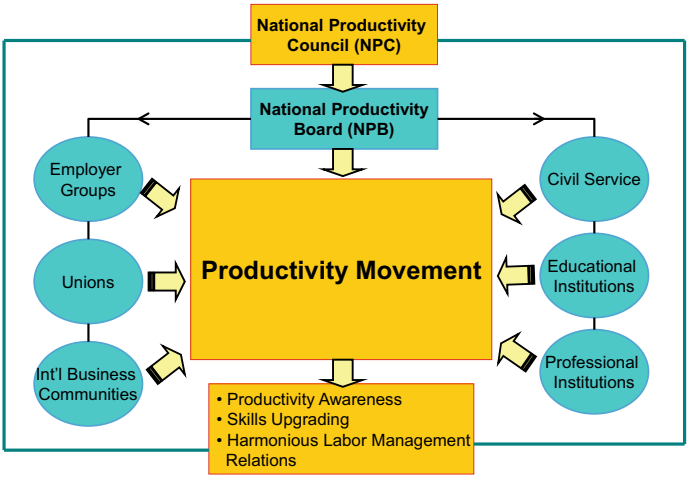

Fig. 4.4 Framework for productivity movement (around the 1980s) (*Source* Ohno and Kitaw [19], based on the information provided by Low Hock Meng [SPA] in September 2010)

SDF, which provides financial incentives to the companies to send their staff to productivity-related training.

4.3.3.1 Channels of Awareness Raising and Scaling-Up

At the awareness stage, the productivity campaign was actively promoted in the public sector. The government, as the largest employer, endeavored to set an example of the private sector to improve productivity, work attitudes, and human resource management. The productivity campaign was linked with civil service reform. The Central Steering Committee was formed immediately after the launch of the Productivity Movement, to oversee the movement within the civil service. Its members also included representatives of the civil service unions. An annual civil service campaign was launched in conjunction with the national productivity campaign. WITs were formed in all ministries to develop plans to promote teamwork spirit and productivity. These voluntary groups met regularly to identify improvements that could be achieved and formulate ways to attain the desired improvements [28].

Regarding labor unions, the National Trade Union Congress (NTUC) spearheaded the productivity campaign and created the Productivity Promotion Council. The campaign aimed to inculcate productivity and quality-consciousness at the workplace. Regarding employers groups, the Singapore National Employers' Federation and Singapore Manufacturers' Federation supported the Productivity Movement. Both unions and employer groups supported the workforce training, with financial incentives coming from the NPB-administered SDF. Furthermore, productivity-related programs and human resource management contents were promoted at various tertiary educational institutions (including polytechnics) to train the future workforce on productivity awareness. In schools, formal curricula teaching teamwork, human relations, and productivity were introduced in various forms, such as group work, moral education, peer-learning, and school essays on productivity [32].

4.3.3.2 Singapore Productivity Association (SPA) as a Partner with the Private Sector

The Singapore Productivity Association (SPA), founded in 1973 as an affiliated body of the then NPB, also played an important role. While the NPB is a public organization charged with the Productivity Movement as a national project, the SPA is a private body comprised of representatives from companies that provide training and disseminate information on the Productivity Movement in the private sector [33].[27] SPA charges fees to its members (institutional or individuals) and organizes

[27] While government organizations can develop 'policies,' they do not have sufficient marketing skills to disseminate them. This often requires separate sales promotion channels and hubs for their policies. In Singapore, SPA complemented the NPB's policy role by organizing productivity campaigns and fora [33].

courses and seminars, company visits, study tours, and so on, to promote their knowledge and skills acquisition. The members have access to information, training and seminars, and networking opportunities. SPA has promoted the active involvement of organizations and individuals in the movement and expedited its diffusion and techniques.

In 2018, with the creation of the Enterprise Singapore (ESG) which has broad mandate of SME promotion as a new one stop agency, SPA became independent of ESG as the national productivity champion. Currently, SPA, through its Singapore Productivity Centre (SGPC), offers training and consultancy services to members and the public. SGPC represents Singapore at the Asian Productivity Organization (APO), as the national productivity organization.

4.4 A Chain of Learning and Diffusion of Quality and Productivity Improvement

As explained earlier, learning from the US, Japan launched productivity and QC movements in the 1950s. Compared to the original US model, which was theoretical and statistical, the modified Japanese method emphasized process orientation, worker participation, and hands-on pragmatism. This method or *Kaizen* spread rapidly among Japanese companies, large and small, to form a core of the Japanese *monozukuri* (making things) spirit [20]. Subsequently, the two oil crises of the 1970s drove Japanese companies to integrate energy savings into their efforts to improve quality and productivity [5], and *Kaizen* activities, while originating in the manufacturing sector, began to spread into the non-manufacturing sectors. A typical example is the expansion of the QC movement. The QC movement was soon introduced in the construction industry (the 1970s), then other industries such as finance and insurance industry, retailers, and hospitals, telecommunications, and railways (the 1980s) [2]. The number of QC Circle registrants reached 200,000 nationwide by the mid-1980s and over 400,000 by the mid-1990s. Now, QC Circle activities can be seen in numerous industries [2].

Based on its own experiences, Japan has been assisting in promoting quality and productivity improvement 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 has become one of the standard menu items of Japanese industrial support in developing countries.

The regional spread of *Kaizen* began in the mid-1980s, coinciding with the globalization of Japanese business activities. The sharp appreciation of the Japanese yen after the 1985 Plaza Agreement prompted Japanese manufacturing companies to shift their production bases to East Asia, where the production costs were lower. Japanese firms have attempted to duplicate their quality management systems 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 assist their local partners in learning *Kaizen* philosophy and practice. In 2005, Toyota published a circle-level identification and instruction guideline for QC circle leaders to globally disseminate the *Kaizen* know-how accumulated by its group companies over the decades, focusing on how to develop methods and plans to achieve the education and training of circle members [11]. The guideline identified four levels of knowledge and skill to learn and apply—from least to highest level in steps that incrementally enhanced learning ability and ability to learn.

In addition, various public organizations, such as the Association for Overseas Technical Scholarship (AOTS), APO, and JICA began their active engagement with *Kaizen* assistance in developing countries. This was the time when JICA started its first project to support the Productivity Movement in Singapore in 1983, at the request of the then Prime Minister Lee Kuan Yew. The above-mentioned organizations including JPC and JUSE, often participated in ODA-funded projects by transferring their accumulated expertise as consultants and experts. After learning from Japan, Singapore also came to offer technical cooperation for productivity improvement in developing countries, including the neighboring Association of Southeast Asian Nations (ASEAN) countries and some African countries [20].

Currently, Japan is promoting quality and productivity improvement in regions beyond Asia, including Latin America and African countries. For example, JICA began providing *Kaizen* assistance in 2006 and implemented *Kaizen* projects in nine African countries. Tunisia and Ethiopia were early adopters and developed their own institutional arrangements to promote quality and productivity improvement (see Chap. 7). More recently, JICA supported the Africa Kaizen Initiative (AKI) in collaboration with the African Union Development Agency-New Partnership for Africa's Development (AUDA-NEPAD) and the Pan-African Productivity Association (PAPA) [8].

4.5 Conclusion: Implications for Successful National Movements

Both Japan and Singapore initially introduced foreign knowledge and management technologies but developed their own models and systems for improving quality and productivity through testing, local adaptation, and institutionalization. They eventually succeeded in nationwide diffusion. Local learning and translative adaptation were key. The final section of this chapter discusses the lessons learned and implications of their experiences for today's developing countries which are keen to learn and develop home-grown national mechanisms for quality and productivity improvement.

4.5.1 National Movements as Societal Learning

From the perspective of local learning and translative adaptation, three points are worth noting. First, national movements for quality and productivity improvement, if properly designed and implemented, are an effective way to promote societal learning and transform the popular mindset toward industrial society. It is important that the government, industry, academia, the workforce, and a broad segment of society participate in the learning process. Second, a mechanism for systemic learning must be established, linking key stakeholders of the society to foster productivity culture and awareness and translate them into actions. This is because a national movement is nationwide engagement with comprehensive coverage and requires continued effort often for a decade or more. Third, there are diverse approaches to introducing foreign models of national movements. In some cases, the government of a recipient country drives the initial learning process, while in other cases, the private sector assumes the role of its initiator.

Although Japan and Singapore took different approaches to initiating and implementing national movements for quality and productivity improvement, societal learning took place in both cases. In Japan, a national movement was initiated with strong ownership of private organizations. The experiences of JMA, JUSE, and JPC discussed in this chapter provide concrete examples of the three-stage process of technology transfer and local learning, adaptation/internalization, and diffusion (see Fig. 1.2 in Chap. 1). With their support, Japanese companies learned and established in-house production management systems. There was enthusiasm for learning across academia, industrial engineers, and companies, and they collaborated closely to improve the quality of Japanese products and the country's industrial competitiveness. Private organizations played a key role in the case of Japan.

The Productivity Movement in Singapore was a government-led initiative, in which Japanese support was effectively used, especially in the 1980s. The Singaporean experience confirms the vital importance of visionary top leadership in initiating, spreading, and sustaining the Productivity Movement. The establishment of centralized oversight and coordination mechanisms charged with implementing and monitoring productivity promotion activities was also important. Core organizations such as NPC, NPB, and SPA functioned effectively, with strong involvement and support of key stakeholders (public sector, unions, employers, and academia). They organized massive awareness campaigns, implemented training programs and consultancy to upgrade skills, and developed manuals and training materials. The Singaporean experience also suggests that the three stages of the Productivity Movement—awareness, action, and ownership—can be a useful reference for a country where the cultural awareness of productivity is low. Singapore dedicated five years to awareness raising, conducting massive campaigns to disseminate productivity culture to the public.

The case studies also suggest that the degree of private sector dynamism greatly influences who initiate and promote societal learning. Where a dynamic private sector

exists, it can take a lead in initiating, scaling-up, and sustaining a productivity movement, and the government can play a supportive role. This was exactly the case in Japan. However, if the private sector is weak as in the case of many developing countries, the government's role becomes even more important in the introduction, adaptation, and development of the productivity movement accompanied by grass-root participation. Private sector dynamism also includes the absorptive capacity to learn, adapt, and internalize foreign technology. So, the educational and training level of the general workforce becomes important.

4.5.2 Six Critical Factors for Successful National Movements

What were the concrete mechanisms and factors that enabled Japan and Singapore to launch, implement, and sustain such national movements? Despite the above-mentioned differences, we can draw certain general lessons as well as common methods and instruments for success. The experience of Japan and Singapore suggests that the following six factors are critical for designing and implementing a national movement that can successfully transform the mindset of the people:

- National commitments for quality and productivity movement;
- Institutional infrastructure for quality and productivity movement;
- Grass-roots awareness raising and participation;
- Standardized training and consulting programs;
- Industry-academia-government partnership for quality and productivity movement; and
- Development of private sector capability to sustain quality and productivity improvement.

First, a national commitment for quality and productivity movement is indispensable. A national movement is nationwide engagement to attain economic and social progress, involving active participation of business, industry, workers, government, academia, and the general public. To orchestrate and sustain national movement, strong commitment by higher officials, organizations, and individuals is required. In Singapore, there was strong commitment and engagement by the top national leader. The deep interest of Prime Minister Lee Kuan Yew was critical in making the Productivity Movement widespread and entrenched in that society. In Japan, a sense of urgency to attain post-war economic recovery and enhance the quality of Japanese industrial products was widely shared among political and business leaders, and even the general public. It was the business leaders that took initiatives to create organizations charged with quality and productivity improvement, with public policy playing a supportive role.

Second, strong institutional infrastructure is needed for a national movement. This includes the establishment of core organizations responsible for implementing and coordinating various activities related to quality and productivity improvement.

Since quality and productivity improvement depend on both national (economic and structural policies and the quality of public administration) and micro (the quality of managerial, professional, and labor resources) levels, the institutional mechanism to support the national movement should embrace both aspects [23]. Moreover, supporting institutions and mechanisms must be created at the central and local levels. This could include the establishment of a high-level national council with a central ministry or agency assuming the role of the lead organization (or national productivity organization) and the secretariat to the national council, and regional, district, and community-level mechanisms for productivity promotion [23]. These organizations must be linked with broader members of the society, namely, key stakeholders such as the government, business (including business associations and chambers), labor, and academia. Such mechanism should provide channels to disseminate productivity awareness and translate that awareness into actions in their workplace, training, and education. The neutrality of core organizations (and the secretariat of the national movement) is vital to engage multi-stakeholders who may have different interests and concerns, including business and labor unions.

Third, awareness raising campaigns and participation at the grass-roots level are vitally important. In both countries, an annual campaign was conducted to promote the theme of quality and productivity, together with the launch of campaigns by the Prime Minister or business leaders, development of the nationwide program, and the formation of QC Circles within workplaces. Especially in Singapore, the government put a high priority on the public awareness campaigns in the first five-years to foster positive attitudes, values, and a culture of productivity. Massive awareness campaigns were conducted, targeting not only workers and managers, but also government officials and politicians, professionals, students, and the general public. In both Japan and Singapore, highly visible incentive and recognition mechanisms were implemented at the national and local levels. Various instruments were mobilized, such as TV, public speeches by senior government officials or business leaders, and national conventions. Also, award programs are effective for promoting campaigns to reward good performers and stimulate interest in best practices and corporate efforts to excel.

Fourth, standardized and well-designed teaching materials, training, and consulting programs must be created to educate government officials in charge as well as private leaders and participants of the movement on the frontline of implementation. These include curriculum, courses, textbooks, manuals, visual aids, e-contents, TV programs, movies, and stories describing successful nations, firms, and individuals. These can be translated from foreign sources or created by national experts, and made available to public through various media, publications, and a web portal site. It is also important to provide education and training systems at the central and local levels that teach both theory and practice to managers and workers, as well as a higher training system for their trainers.

Fifth, partnerships among industry, academia (including universities), and the government are also important. The Japanese and Singaporean experiences confirm that such linkages work effectively for: (i) studying various international best practices; (ii) producing a new model most suitable for the domestic context by selecting, adjusting, and combining foreign components; and (iii) conducting practice-and

application-oriented training. Such linkages should be also useful for preparing suitably trained graduates to meet the manpower needs of industry and providing internship for students.

Lastly, there is a need to develop a critical pool of private management consultants to self-sustain the national movement. The national movement must continue for a sufficiently long time, typically over a decade or more, with evolving emphases. Japan did not face major problems with the sustainability or development of private sector capability—thanks to the existence of a dynamic private sector and core organizations. Furthermore, the companies' top management and engineers had adequate knowledge to understand the relevant skills and techniques and the desire to adopt them. Factories also had workers capable of absorbing the new management technologies.

As the Singaporean experience shows, for many developing countries, the national movement can be initiated and led by the government through public agencies, But it must be gradually transferred to the private sector to maintain its sustainability. In the case of Singapore, the JICA-supported PDP undertook capacity development of NPB counterparts, as well as private sector consultants. Under the 'Management Consultancy Referral Scheme' and the 'Associate Consultants Scheme,' those trained under the JICA project became NPB Associate or Referral Consultants and were mobilized as 'qualified' private management consultants [17]. As such, a pool of associate and referral consultants was created to supplement NPB's efforts in reaching out to industries. Such efforts are critical for fostering a feeling of ownership of the productivity movement by individuals. To this end, it is important for core organizations to train private management consultants so that they support productivity improvement at industry and company levels.

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Chapter 5
Bilateral Policy Dialogue: Japanese Cooperation for Enhancing Industrial Policy Capacity

Kenichi Ohno, Akio Hosono, Kuniaki Amatsu, and Minoru Yamada

5.1 Introduction

Bilateral policy dialogue is one of the schemes of Japanese development cooperation that has arisen naturally from Japan's long and extensive economic support to latecomer countries. It is neither purposefully contrived nor standardized. It typically starts with an earnest request by a top national leader—often the president or the prime minister—of a developing country who covets practical policy knowledge from Japan to accelerate economic growth or overcome an economic difficulty. Internal policy contests or external pressure from international organizations are usually the background to such requests. The Japanese government normally responds positively by deciding the most appropriate topics, modality, frequency, duration, dialogue partners, and team leaders on the Japanese side. An appropriate cooperation scheme is chosen as JICA has no preset scheme for bilateral policy dialogue per se. Through preliminary consultation and agreement, dialogue details are customized to the unique needs and situations of the candidate country rather than set in a prearranged format.

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Japan's policy dialogue is different from the 'policy dialogues' conducted by other advanced nations or international organizations. It is not an offering of reports, workshops, and study tours to show off the wonderful past achievements of a donor country. Japan often recommends benchmark countries other than itself to deal with problems in developing countries because Japanese models are sometimes too remote or different for others to emulate. This is possible because Japan has over the years accumulated broad and deep knowledge of many developing countries, especially in Asia, and can select the best model for each case from among them. Japan's approach is also unlike an intensive negotiation of policy conditionalities of international organizations as a quid pro quo for loans to finance a flagship project or a balance-of-payments gap. Japan does provide technical assistance and loans to support policies discussed in policy dialogue but this is in the spirit of realizing bilaterally agreed actions rather than ensuring the repayment of the loans provided.

This chapter explains the characteristics of Japan's policy dialogue with the governments of developing countries.[1] After an overview (Sect. 5.2), it presents four concrete cases from Argentina, Vietnam, Ethiopia, and Thailand to verify the common features of the Japanese approach as well as to demonstrate how dialogues are customized to each country's particular circumstances (Sects. 5.3–5.6). We focus on industrial policy in which Japan has a comparative advantage and most policy dialogues are conducted, but the scope of policy dialogue may also extend to agriculture, services, finance, macroeconomic issues, and others depending on the host country's request.

5.2 Features of the Japanese Policy Dialogue

Table 5.1 is a selected list of countries with which Japan has officially conducted bilateral policy dialogue with sufficiently strong high-level mutual commitments and large resource mobilization. There are also numerous other projects in which Japanese officials and experts have studied, discussed, and/or recommended development policies in less systematic or continuous ways. Whether large or small, Japan's bilateral policy dialogue with developing countries exhibits the following features as distinct from other donors and international organizations.

The first salient feature is country customization. Japanese development officials and experts know very well that Japanese methods, no matter how effective they were at home, cannot be copied and pasted to another country with a different history, culture, and social fabric. In introducing a Japanese model, they pay great attention to transferability and the need to adjust to local conditions. Such adjustments should in principle be done locally rather than imposed from outside, but this may not happen automatically in many developing countries. In such circumstances, Japanese

[1] This chapter is a condensed summary, with a new introduction and additional explanation, of the four chapters contained in Ohno et al. [28]: Chaps. 6 (Argentina), 7 (Vietnam), 8 (Ethiopia), and 9 (Thailand).

Table 5.1 A selected list of Japan's development policy support

Country	Phases	Key members from Japan	Remark
Argentina	1985–1987 1994–1996 (follow up)	Saburo Okita (former foreign minister, IDCJ); Hirohisa Kohama (IDCJ), Akio Hosono, Kotaro Horisaka (professors); JICA	Agriculture and livestock farming, industry, transport, export promotion (Okita Report). Follow-up phase studied measures to strengthen economic ties with Japan/East Asia
Vietnam	1995–1996 1996–1998 1998–1999 1999–2001	Shigeru Ishikawa, Yonosuke Hara (professors); JICA	Large-scale joint study on macroeconomy, industry (with in-depth studies of selected sectors), agriculture, enterprise reform, and financial crisis management (Ishikawa Project)
Paraguay	1998–2000	Kagehide Kaku (DIR), Hidesuke Kotajima (DIR); Akio Hosono (professor); JICA	Economic development, competitiveness, and export promotion (including clusters and agro-industry chain)
Thailand	1999	Shiro Mizutani (former MITI official); JICA	Study on SME promotion policy (Mizutani Plan)
Indonesia	2000	Shujiro Urata (professor); JICA	Policy recommendations for SME promotion
Myanmar	1999–2002	Konosuke Odaka (professor); JICA	Agriculture, rural development, industry, trade, finance, ICT, etc.
Mongolia	1998–2001	Hiroshi Ueno and Hideo Hashimoto (ex-World Bank economists and professors)	Study on economic transition and development
Indonesia	2002–2004	Takashi Shiraishi, Shinji Asanuma, Shujiro Urata (professors); JICA	Macroeconomic management, financial sector reform, SME promotion, private investment promotion, democratization, decentralization, human resource development
Laos	2000–2005	Yonosuke Hara (professor); JICA	Macroeconomy, finance, state enterprises, FDI, poverty reduction
Vietnam	2003-present	Keidanren, Japanese embassy, JICA, JETRO, JBIC	Bilateral joint initiative to improve business environment with action plans and 2-year monitoring cycles
Ethiopia	2009–2011 2012–2016 2017-present	Kenichi Ohno, Izumi Ohno (GRIPS professors); Japanese embassy, JICA	Policy methods and organizations, kaizen, export promotion, champion products, FDI policy and support, SME support, productivity, automotive assembly, inviting Japanese FDI, etc.
Myanmar	2012–2015	Konosuke Odaka, Shigeru Matsushima, Toshihiro Kudo (professors); METI, JICA	Supporting economic reform program covering finance, trade, investment, SMEs, agriculture, rural development

(continued)

Table 5.1 (continued)

Country	Phases	Key members from Japan	Remark
Laos	2019–2020	Toshiro Nishizawa, Terukazu Suruga, Takuji Kinkyo, Kazue Demachi, Fumiharu Mieno (professors), MOF, JICA	Joint policy research and dialogue for fiscal stabilization, fiscal and debt management, resource export, balance of payments, financial system development

Source Authors' research based on JICA information
Abbreviations DIR (Daiwa Institute of Research), GRIPS (National Graduate Institute for Policy Studies), IDCJ (International Development Center of Japan), JBIC (Japan Bank for International Cooperation), JETRO (Japan External Trade Organization), JICA (Japan International Cooperation Agency), METI (Ministry of Economy, Trade, and Industry), MITI (Ministry of International Trade and Industry), MOF (Ministry of Finance), SMEs (Small and Medium-sized Enterprises)
Note This table lists Japan's bilateral policy dialogues that are large-scale and/or worthy of special mention. Besides these, Japan also offers policy advice by dispatching advisors to heads of state or ministers, ministries, and agencies; reports on development strategy; training courses and site visits; conferences and seminars, etc. in various scales and durations

experts usually conduct in-depth surveys of the local situation and talk to many local stakeholders to explain the Japanese model and encourage them to consider its suitability and the need for modification. This strategy of importing foreign things with local adjustment, called *translative adaptation* [23] was continually practiced throughout the two millennia of Japanese history during which the nation vigorously imported advanced institutions and technologies, first from China and India and later from the West, but only after modifying them to suit the existing Japanese social landscape. Japan wants to practice the same when it assists today's latecomer countries.

The second feature is real-sector orientation. Japanese experts hardly deny the importance of macroeconomic stability, a favorable investment climate, and a sound financial system as the preconditions of growth. However, their main concern and assistance center on real-sector issues such as quality, productivity, product development, marketing, competitiveness, and structural transformation. Competitiveness must be fostered not generally but concretely for chosen sectors, whether these are garments, automobiles, or software development. Japanese officials and experts go to *gemba* (places where production takes place such as factories and farms) to work with locals rather than managing projects and drafting papers at offices and hotels. They are not very good at writing documents for reporting or dissemination. Japan habitually argues that targeted sectors and firms must be strengthened before an economy jumps into liberalization, privatization, or global and regional integration. The speed of such opening measures must be paced to the improvement of domestic competitiveness. The Japanese typically advise the setting of long-term goals and working backwards from these to determine actions needed today and tomorrow instead of myopic muddling through to deal with the problems at hand. However, Japan seems somewhat worried and puzzled at the emergence of Industry 4.0 and other advances in information and communications technology (ICT) that may result in an entirely

new way of manufacturing. It is unclear whether the Japanese *gemba* approach loses validity or remains equally effective in this new technology environment.

Third, a wise state is advocated, not a small one. Official intervention in selected sectors has been strongly discouraged by the World Bank and the International Monetary Fund (IMF) as impractical and risky. The Washington Consensus argued that governments generally lacked information on truly prospective industries and were often hijacked by political interests [22]. These are indeed serious problems, but we also witness governments that have overcome these challenges. Policy capability is not given but mutable. Policy learning through trial and error is not only possible but vital for national development as exemplified by many governments in East Asia. Faced with significant policy risks, Japan's advice is to learn and improve rather than shrink and stand still. The whole idea of bilateral policy dialogue is based on the premise that policy capability can be improved rather than an unalterable destiny.

These are the features clearly visible in the four country cases presented below as well as in numerous other cases which are omitted due to space limitations. Among these cases, particularly noteworthy are Japan's own experience of recovery from the total war defeat in the late 1940s in which Saburo Okita, the head of policy dialogue with Argentina (Sect. 5.3), played a key role [30], Japan's criticism of the World Bank policy which culminated in the East Asian Miracle report [37], Japanese cooperation with developing countries in serious indebtedness or systemic transformation in the 1980s and 90s, and Japanese advice to the heads of African states at the Fourth Tokyo International Conference on African Development (TICAD IV) meeting in Yokohama [20].

The validity of bilateral policy dialogue must be assessed from the perspective of nation-building (for the developing country) and strengthening mutual relationship (for both parties), not just as one of the many donor-supported projects whose performance can be monitored with short-term performance indicators. With policy dialogue, the process is far more important than the results—contribution to growth, technology upgrades, industrialization, and so on—which are usually not obtainable in the short run and difficult to measure even in the long run. Furthermore, personal bonding and trust between national leaders and the Japanese dialogue team are critically important as evidenced by the concrete cases below. While some may argue for neutrality and arms-length dealings in development cooperation, policy dialogue is all about solidifying personal relations without which success can hardly be obtained.

It must also be admitted that success is not always guaranteed. Policy dialogue is very difficult to start, sustain, and produce results in comparison with building infrastructure according to a blueprint or training officials using standard materials and format. Because its content and modality are variable and because personal rapport is critical, the dialogue may easily lose momentum in a change of government or key dialogue partners. Furthermore, there is no one correct answer to the kind of questions raised by policy dialogue, be it the selection of priority sectors, the type of institution, or the proper sequencing of policies. Multiple future paths are open to a nation provided that the policy to support them is well prepared. Moreover, appropriate choices constantly shift as circumstances and national interests evolve. The effectiveness of a development model depends not only on the suitability of the

model to the country but also on the commitment and effort of the host government to make it work.

Whether the (modified) foreign model takes root in the domestic society is unpredictable as its adoption is an interactive process between two different cultures with no assurance of compatibility in advance. Local adjustment of a foreign model must be attained through trial and error and learning by doing. For better or worse, foreign model adaptation frequently produces unexpected turns. Local adjustments are imperative but wrong revisions that kill the policy essence must be avoided. Nowadays, country ownership is regarded as the golden rule of development cooperation, but local mindset and ideas are not always right. The development path is also influenced by such non-economic factors as politics, pressure from interest groups, a misconception by the official in charge, and so on. The golden rule must sometimes be bent, and well-informed foreigners must lead temporarily when the host country lacks the necessary knowledge and motivation. This is a subtle operation riddled with many risks. High diplomatic skill is needed to perform this graciously without marring the relationship with the partner country.

We may even ask why foreign help is needed when the government of a developing country must be the architect of development policy. The best solution may be to let local leaders and officials take up the challenge and struggle for themselves. But foreigners may be useful under certain conditions. First, there may be too few competent domestic technocrats or experts, and qualified people may be discouraged to serve the government. Second, in some countries, foreign advice (with possible financial support) is valued more highly than domestic one, generating a greater impact on policy speed and scale. Third, foreign assistance may push the country in the right direction when there is internal policy competition. Fourth, foreigners may play the role of a catalyst before locals can fully assume the policymaking responsibility. It must be added that the best a foreigner can do is to support domestic efforts from the sideline rather than become a key player or manager. Without domestic effort, external help is hardly effective.

Some critiques question the replicability of bilateral policy dialogue as a development cooperation scheme beyond a few exceptional cases. Their concern is reasonable but that does not undermine the validity of policy dialogue. This is a cooperation method not designed to be universally applicable, not a scheme to be marketed to all developing countries. Time, resources, mindsets, and conditions demanded on both sides of the dialogue are formidable, and dialogue should not be started unless both parties are equally ready and committed. Japan should not engage in policy dialogue unless a top national leader earnestly desires Japan's intellectual assistance. At present, the number of eligible dialogue requests remains small and manageable.

5.3 Argentina, 1985–1987 and 1994–1996

5.3.1 Background

The manufacturing sector of Argentina gradually grew as a result of the industrialization drive that began prior to World War II. By the end of the 1970s, the share of manufacturing in GDP had increased to 36% while that of agriculture had declined to 12%. Argentina then had a higher share of manufacturing in GDP than Brazil though manufactured exports had a smaller share of Argentina's total exports than Brazil's. At this time Argentina's export was dominated by agricultural and livestock products such as beef, wheat, maize, foraging crops, seeds for vegetable oil, and so on, which contributed 78% of exports while industrial products accounted for 22%. On the import side, the share of consumer goods was small thanks to the ongoing import substitution of such goods. Intermediate goods and capital goods accounted for 73% of total imports in 1979. Imports of fuel were also low because the country was self-sufficient in petroleum [10].

However, the prolonged import substitution strategy had an adverse effect on the Argentine economy. From the second half of the 1950s, Argentina frequently experienced growth stagnation. In the mid-1970s, the economic crisis was aggravated by high inflation, negative growth, and political turmoil. A chain of military leaders ruled the nation. General Jorge Rafael Videla staged a military coup in 1976. The Videla administration liberalized the economy but failed to control inflation. In 1980, the country faced balance of payments difficulties. General Roberto Eduardo Viola took office in 1981, but the economic and political crises continued. General Leopoldo Fortunato Galtieri succeeded Viola at the end of 1981, but the economic crisis further deepened due to the War of the Malvinas (Falklands War) against the United Kingdom. In 1982, many Latin American countries, including Argentina, were hit by a serious external debt crisis. Faced with the debt crisis and defeat in the Malvinas War, the military government had no choice but to relinquish power. At the end of 1983, Raul Alfonsin was elected as the first president of the new democratic era. He formulated a new development strategy and requested Japanese cooperation. JICA dispatched a Japanese study team that commenced work in August 1985.

The Study on Economic Development of the Argentine Republic, or the Okita Report for short, was Japan's first large-scale development policy support to a developing country. The Japanese team was headed by Saburo Okita, a renowned economist and statesman who was an architect of the Japanese postwar economic recovery program in the late 1940s and subsequently served as Foreign Minister.

The Argentine economy was going through another difficult period as Japanese cooperation began. Five months before the Japanese team arrived, the IMF suspended its standby credit to Argentina because of the country's non-fulfillment of the loan conditionality. In protestation against the deteriorating economy, workers staged general strikes. In June 1985, the Austral Plan, a drastic austerity policy, was introduced to suppress inflation. This was a shock therapy that reduced the currency denomination by 1,000% in the switch from the peso to the new austral, with a

general freeze of prices and public utility charges. The JICA cooperation was carried out during the Austral Plan period when inflation was brought under control by these severe measures. The Okita Report was submitted to President Alfonsin in January 1987.

5.3.2 Main Pillars and Recommendations

During the first phase of the Okita Report cooperation (1985–1987), intensive policy dialogues were held between President Raul Alfonsin and Saburo Okita alongside meetings with the Minister of Economy and the Minister of the Planning Secretariat. About 30 Japanese experts, mostly economists, and about 30 Argentine counterparts participated in the study.

The main agenda was agreed upon by both parties at the outset: macroeconomic issues, agriculture, livestock, industry, transport, and exports. In close cooperation with the Argentine counterparts, the Japanese mission evaluated the structural characteristics of the Argentine economy and productive sectors. Policy measures were explored to remove barriers to development. The Japanese team emphasized the importance of the market economy and a reform process that should redefine economic policies [7]. The promotion of external trade and foreign direct investment (FDI) was considered essential. The Okita Report stated that Japanese experiences in the post-World War II period could offer policy options and possible measures for industrial development and export promotion. A special volume summarizing the Japanese experience was prepared as part of the Okita Report.

Apart from high-level meetings, the Japanese team frequently met scholars, NGOs, enterprises, and industry associations to exchange views on economic development from a long-term perspective. Among them, the mission had close contact with *Fundación Mediterranea*, a think tank headed by Domingo Cavallo, who later served as the Minister of External Relations and the Minister of Economy in the Carlos Menem administration that succeeded the Alfonsin administration. Among enterprise associations, interactions with the Sociedad Rural Argentina (Argentine Rural Society) and the Union Industrial Argentina (UIA) were most significant. The president of the former was Guillermo Archouron, who later became the first President of Fundación Okita (the Okita Foundation) as explained below.

The Okita Report emphasized industrial development and export promotion. ‘Based on Japanese experience during postwar economic development, but with the awareness of the different circumstances between Argentina and Japan, the study team has tried to present policy implications and suggestions for the said five sectors’ [10]. The Report made proposals on the future directions of the Argentine economy, the role of government, and the dynamism of the private sector. With regard to the first, the restructuring of the industrial sector was urged through increased competition, gradual liberalization, and selective industrial policy to promote strategic sectors. It was argued that foreign exchange earnings from traditional agriculture were not enough to activate the entire economy and that more focus should be given to the

industrial sector. For this, competition must be introduced with a clear scenario for steady but not-too-hasty liberalization in the medium to long run. Argentina was endowed with fertile land (Pampas), petroleum, natural gas, and well-educated people. These endowments had to be utilized effectively. An industrial policy that selectively promoted the agro-industry, the petrochemical industry, the computer industry, the machine tool industry, and the bio-industry was recommended.

Concerning the role of the government, the Report stressed transparency in providing an economic perspective as 'it is of primary importance that the government ensures the continuity and consistency of basic economic policies it pursues… One effective way to ensure overall continuity and consistency of economic policies is to formulate a medium- and long-term plan based on the national consensus. The plan should offer the framework and standards with which the private sector can envision its future business prospects and make investment decisions accordingly. Argentina at this stage will need an economic plan that contains specific policy statements and concrete commitments' [10].

To activate the private sector, the Report highlighted the market mechanism, the privatization of public enterprises, support systems for research and development, and the development of efficient infrastructure. 'It is important to the Argentine economy to create an environment where the market mechanism functions properly. For this purpose, it will be necessary to establish competitive conditions in the domestic market by withdrawing the excessive protection given to domestic industries' [10]. The Report also emphasized the importance of advanced technology and innovation as well as a partnership between government, the private sector, and universities.

Specific recommendations were also made for agriculture, industry, transport, and exports. For example, a study reviewed the past trends and the structural characteristics of the industrial sector and examined the current situations and future prospects of its pre-selected three subsectors, namely, petrochemicals, electronics, and agro-industry. It then analyzed small and medium industries that the Argentine government considered important in its industrial promotion.

More generally, the Report offered the following advice for the new Argentine industrial policy: (i) identify clear guidelines for industrial promotion; (ii) introduce competitive conditions for industrial production; (iii) formulate government policies through consultation with the private sector; (iv) enhance the confidence of foreign capital; (v) strengthen support systems for technology development; and (vi) establish a long-term capital market. These key messages reflected the economic philosophy of Okita himself who had managed Japan's postwar economic crisis and staged a subsequent high growth period.

5.3.3 How the Report Was Received

The Okita Report was prepared in the mid-1980s during Argentine's debt-ridden lost decade. The orthodox approach to crisis management at that time advocated liberalization, privatization, and small government. Let us see how the Okita Report was received by Argentina's economists and national leaders.

Jorge Vasconcelos of *Fundación Mediterranea* considered the Okita Report, which condemned import substitution and heavy protection, to be more 'orthodox' than the previous state-led and domestic market-oriented approach. However, he added that it was heterodox in relation to the supposition that a simple change in the rules of games would suffice to relaunch the Argentine economy. The Report was averse to quick economic liberalization and recommended selective promotion of strategic industries. Notably, 'it warned that restructuring of the industrial sector should be realized through strengthening its competitiveness in domestic and foreign markets' [36].

Aldo Ferrer, a well-known economist, published a comprehensive review of the Okita Report [3]. He stated that 'orthodox bias had been prevailing since the mid-1970s in the political economy of Argentina' and that 'the Okita Report's perspective provokes significant convergence with the heterodox visions of Argentine authors' including himself. He pointed to the outstanding function performed by the Japanese public sector in technological development and integrating actors including enterprises, the scientific community, and political power. Ferrer also argued that 'Japan never handed over to the static comparative advantage revealed by the international division of labor and resource endowments in a static scheme' and that 'Argentina's economic development demands the active presence of the State in a market economy.'

According to Nélida B. Mairal, adviser of the Ministry of Economy, the sectors that made the biggest efforts following the Okita Report were agriculture and the computer industry [1]. Juan Carlos Yamamoto, a former deputy representative of the JICA Argentina Office, echoed that agriculture was most active in implementing the Okita recommendations which led to the development of biotechnology and the strengthening of the National Institute of Agricultural Technology (INTA).[2]

Okita on several occasions exchanged views with Domingo Cavallo, a well-known economist of the orthodox approach. When Cavallo was appointed the Minister of External Relations of the Menem government, he invited Okita to Argentina in September 1990 to receive a decoration from his government and present the Okita Report to a wider audience.[3] Later, in 1992, Cavallo became the 'Super Minister of

[2] This is based on an interview transcript titled "Entrevista con Juan Carlos Yamamoto" [Interview with Juan Carlos Yamamoto], which appeared in an Argentine newspaper Clarín on September 23, 2006.

[3] According to Okita [30], the Menem government wanted to revisit the Okita Report. President Menem made the opening speech of the two-day seminar at which Okita presented the first report. Okita passed away in February 1993.

Economy' and the promoter of the Convertibility Plan which generated economic growth for several years known as the 'Miracle of La Plata.'

Alejandro Mayoral, Undersecretary of the Ministry of Economy, Public Works, and Services, stated that '[i]n 1985, as a result of the Okita I: Study on Economic Development of the Argentine Republic, our country received valuable information and recommendations, most of which have been implemented since 1989 and formed important lines of thinking for the modernization of Argentina… In 1989, Argentina initiated deep economic reforms [the Convertibility Plan] to stabilize, deregulate and open its economy' [32]. Mayoral went on to say that the country made steady efforts to promote trade and attract FDI, created and joined MERCOSUR (Southern Common Market consisting of Argentina, Brazil, Paraguay, and Uruguay), and initiated a new approach to Japan and East Asia. President Menem, Minister of Economy Cavallo, and other officials and business people began to travel frequently to this region.

5.3.4 The Follow-Up Reports and Sectoral Cooperation Projects

These remarks confirm that the Menem administration inherited the Okita Report as a valuable asset. After implementing the Convertibility Plan, President Menem, and Minister of Economy Cavallo in 1992 asked the Japanese government to cooperate with the second Okita study on the economic development of Argentina focusing on exports and FDI. The government wanted to ensure sustained growth and develop the export potential of Argentine products. The new study, the Study on Economic Development of the Argentine Republic (Okita Report II), was prepared jointly by JICA and the National Undersecretary of External Trade of the Ministry of Economy during 1994–1996. It analyzed the macroeconomic and sectoral environment after the Convertibility Plan of 1989. It also examined the possibility to expand export markets to Japan and other East Asian countries and increase FDI from this region [32]. These measures helped Argentina to have a global perspective and new export options. For this, the lack of competitiveness of Argentine products and the need to upgrade physical and institutional infrastructure were identified as the main challenges.

JICA introduced new cooperation projects in Argentina partly to realize the recommended actions of Okita Reports I and II. In the industrial sector, the Project of Center of Technology of Containers and Packing (1989–1993), the Project of Upgrading of Design and Manufacturing of Industrial Machinery (1995–1998), and the Project of Energy Saving in Industries (1995–2000) were conducted through the National Institute of Industrial Technology (INTI). For promoting industrial SMEs, the Study on the Promotion of Total Quality Control for Small and Medium Scale Industries and Certification System for Industrial Export Products (1989–1990) and the Study on Revitalization of Small and Medium Enterprises (2004–2006) were implemented. The Project of Training Center for Informatics was executed through the

National Institute of Technological Education of the Ministry of Education (1991–1996). Many projects in agriculture, livestock, and fishery were implemented through INTA and other institutions. Several projects were implemented in the mining sector as well.

One important event was the establishment of the Okita Foundation in 1991 in Buenos Aires to disseminate and follow up on the Okita Report. The Japan Advisory Committee of Okita Foundation (FO-JAC) was set up in Tokyo as a counterpart organization to the Okita Foundation.

Another follow-up study was started in 2002 to update Okita Report II in the aftermath of Argentina's financial crisis of 2001 by identifying challenges faced by specific productive sectors. This was sponsored by JICA and supported by the Okita Foundation, the Buenos Aires Office of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), and others.

5.3.5 Assessment

Argentina in the early 1980s was in transition from military governments to civilian rule and faced enormous economic challenges of low growth, low competitiveness, lack of economic transformation, a debt crisis, and hyperinflation. An overhaul of policy direction away from deep-rooted and inefficient import substitution was called for. The Okita Report continued to be used by Argentina as one of the basic references for development and industrial strategies for some decades. It also served as the guideline for Japan's economic cooperation in Argentina from this time onwards. The Report also spawned many other Japanese policy support programs in Latin America with various purposes, scales, participants, and duration.

It is worth reiterating the special place the Okita Report occupies in the history of Japanese development cooperation. It was Japan's first coherent and large-scale policy advice not directed to itself or its former colonies and exhibited various common features shared by Japan's subsequent bilateral policy dialogues. They included country customization, real-sector orientation, backward targeting to reach long-term goals, selective sector promotion, and the importance of the state's capacity in terms of policy contents as well as the importance of top leaders, mutual trust and commitment, policy action to follow the talk, interviews with diverse stakeholders, and flexible modality and methods. However, this does not necessarily mean that Japan's subsequent policy dialogues benchmarked the Okita Report in their formulation and execution. The similarity in Japanese policy dialogue contents and methods reflects the inherent Japanese development mindset that permeates across generations, of which Okita's was one prominent example, rather than the fact that Okita was the first to apply it to development cooperation. Essentially the same policy orientation was visible as far back as the nineteenth century if not before, and there

is little evidence that the designers of subsequent bilateral policy dialogues took cues from Okita's arguments and cooperation framework.[4]

On the other hand, the Okita Report stood out in certain aspects from other policy dialogues. First, the high esteem Okita commanded as the savior of the postwar Japanese economy and as Foreign Minister produced an impact on Argentina's policy and bilateral relationships to a degree that no other dialogue has been able to produce. Second, the topics were broad and touched not only on macroeconomic and sectoral issues but also on fundamental national directions such as protection versus opening and agriculture versus industry. Third, the Okita Report chose postwar Japan as the benchmark for Argentina, unlike other policy dialogues which looked to many latecomer countries other than Japan to produce the most fitting recommendations for the particular countries and sectors in question. This may have been partly due to Okita's deep personal involvement in Japanese development and partly due to the lack of time and resources to collect and analyze information from other countries.

5.4 Vietnam, 1995–2001

5.4.1 Background

The Economic Development Policy in the Transition toward a Market-oriented Economy in the Socialist Republic of Viet Nam,[5] or the so-called Ishikawa Project, was JICA's policy support to Vietnam from 1995 to 2001. The policy research philosophy of Professor Shigeru Ishikawa, its leader, guided its execution. Vietnam at the time was both a low-income country and a country in systemic transition where productivity improvements and the wholesale reform of economic institutions were simultaneously required.

In 1986, Vietnam officially launched the Doi Moi (renovation) reform to modify its socialist economic management, which had failed to work, by gradually introducing the market mechanism. Progress was initially slow. By the early 1990s, the collapse of the Soviet Union, Vietnam's largest patron, and the withdrawal of Vietnamese troops from Cambodia prepared the stage for the country to rejoin the Western world. In the mid-1990s, inflation subsided and official development assistance (ODA) and FDI began to arrive, but fiscal and trade deficits remained considerable. Vietnam was

[4] Three of the four co-authors of the present chapter were a leader or active participants in the four bilateral policy dialogues detailed in this chapter. None of us detected any direct influence of the Okita Report in the subsequent project design and some were even unaware of its structure or content. Nonetheless, different bilateral policy dialogues spontaneously converged on the same Japanese norm.

[5] The official name of the project was slightly revised for each subsequent phase.

very poor,[6] domestic savings were low, and the government did not have a clear idea as to how economic development and systemic transition should be simultaneously pursued [11, 38].

The World Bank and the IMF assisted Vietnam with a wide range of reform programs and financial support in fiscal reform, monetary policy, financial sector reform, trade reform, rural support, price liberalization, exchange rate management, and state-owned enterprise reform. In 1993, a standby credit was arranged with the IMF. In 1994, the World Bank provided structural adjustment credit (SAC) and the IMF agreed to an extended structural adjustment facility (ESAF). Through these programs, however, a policy gap between Vietnam and the international organizations became apparent. According to then Minister of Planning and Investment Tran Xuan Gi, 'tensions were mounting between the Vietnamese Government and the International Financial Institutions (IFIs) over conditionality.' The Vietnamese government felt that 'the long lists of conditions imposed by the Bank and the Fund were painful and humiliating.' The negotiations for SAC II broke down. The reform packages that seemed moderate to the World Bank and the IMF were considered drastic by Vietnam.

The Vietnamese government sought a 'third-party opinion' as it prepared the Sixth Five-Year Development Plan 1996–2000 (FYP6) with the slogan of *Industrialization and Modernization* by the year 2020 and an ambitious growth target [12]. Meanwhile, in Japan, JICA's Country Assistance Study on Vietnam was being drafted by a team headed by Shigeru Ishikawa, an economist with a profound knowledge of Chinese economic development. The Study was needed to formulate a country assistance strategy as Japan resumed ODA to Vietnam. It was completed in 1995 and handed over to Do Muoi, the General Secretary of the Communist Party of Vietnam, via diplomatic channels. Do Muoi was greatly impressed with its deep insights and pertinent recommendations. He met Ishikawa on a visit to Tokyo and invited Ishikawa to Vietnam to advise on the draft FYP6. Vietnam then submitted an official request for Japanese policy support and the Ishikawa Project began.

In June 1995, Ishikawa visited Vietnam to discuss with the Vietnamese counterpart the drafting of FYP6 which had to be submitted to the National Assembly by October 1995. The Vietnamese urgently requested Ishikawa to assist in the finalization of the draft, but the Japanese side felt that the time was hardly enough to do decent work. The two sides eventually agreed on a two-step approach. First, the Japanese team would prepare written comments on some key issues that should be included in the draft FYP6. Then it would comment on the three issues raised by the Vietnamese side concerning global and regional economic forecasts, tax reform, and the budget law. Japan also agreed to conduct a fuller study on the Vietnamese economy and submit a report by April 1996. This was later called Phase 1 (1995–1996), followed by Phase 2 (1996–1998). Subsequently, a follow-up study was produced in 1998–1999 to cope with the Asian financial crisis of 1997–1998, and further work was

[6] According to the World Bank national accounts data accessed in March 2020, Vietnam's per capita GDP was mere 95 USD in 1989. It was still as low as 277 USD in 1995 when the Ishikawa Project started.

conducted in Phase 3 (1999–2001). After the completion of the Ishikawa Project, four thematic policy research projects were spun off and continued until early 2004 that investigated issues related to agriculture, personal income tax, monetary policy (dollarization), and industrialization.

5.4.2 A Penchant for Heavy Industries

Vietnam's economic policies in the mid-1990s were forged by responses to immediate crises and emerging issues as well as external pressure mainly from the World Bank and the IMF, which made economic management rather complicated. Ishikawa and his team believed that Vietnam needed a long-term reform and development scenario and a concrete way to achieve it apart from short-term responses and pressure. China, which initiated systemic reform in 1978 and formulated a comprehensive reform plan by 1993, was regarded as the benchmark country for this purpose. While China took 15 years to draft a roadmap, Vietnam might be able to shorten the period with the advantage of a latecomer learner [9].

Furthermore, Vietnam's long-term scenario had to be realistic. The Vietnamese government expected the industrial sector to grow at 14.5% per year from 1996 to 2000 and contribute 31.5% of GDP by 2000. FDI attraction, the promotion of the non-state sector, and the competitiveness of state-owned enterprises were to be prioritized. Both import substitution and export-led industrialization were targeted [14]. With its legacy of economic planning, Vietnam had a strong inclination toward quantitative targeting. In the draft FYP6, targets were meticulously set for consumer products, oil refinery, urea fertilizer, petrochemicals, machinery, electrical and electronics, construction materials, iron and steel, and so on. Most of the targets appeared too ambitious to the Japanese economists and officials. Setting too many high goals in all sectors was likely to result in the achievement of none. Vietnam experienced an investment boom in 1994 just before the Ishikawa Project began as foreign investors re-discovered the country. This may have biased the Vietnamese government to be overly optimistic about the future of Vietnamese industrialization.

Confidence and ambition were often expressed in meetings with the Japanese team. The initial draft of FYP6 contained large-scale investment projects in steel, oil refinery, ethylene center, and so on that would use domestic natural resources. The Vietnamese team said that the era of textile and garment was over, and that the era of the high-tech industry would come. To the eyes of the Japanese, however, Vietnam's textile and garment industry was still embryonic with great potential to grow into the nation's leading export sector. At about the same time, a foreign firm that promised to invest in an oil refinery in Vietnam announced its withdrawal from the project, which raised concern within the government about the feasibility of the heavy industrialization plan of the draft FYP6. Policymakers who had high hopes of attracting large-scale foreign investment became confused. Although this incident was not sufficient to dislodge the upbeat projects from the draft FYP6, a careful review of their selection and implementation became necessary.

The Ishikawa Project team was requested to study the best path for Vietnam's heavy industrialization by assessing the potential of the steel, oil refining, petrochemicals, urea fertilizer, and cement industries highlighted in the draft FYP6. Ishikawa made some initial observations before undertaking this study. First, Vietnam was in the early stage of industrialization where a modern industry sector had not yet emerged, a situation similar to China in the early 1950s. Second, the two theoretical models of economic development, the dual economy model of Arthur Lewis featuring agriculture and industry and the Feldman model featuring consumer goods and capital goods, should be combined to interpret the challenges Vietnam faced. Third, both modern industries and local SMEs needed to be considered, as both would play crucial roles in industrialization. Fourth, the historical experiences of East and Southeast Asia would be very helpful in mapping the future, including the tendency of simple labor-intensive exports to be in time replaced by more sophisticated but still labor-intensive industries [12, 13].

5.4.3 Three Phases

The Ishikawa Project covered agriculture, industry, enterprise reform, tax reform, macroeconomic management after the Asian financial crisis, and so forth. The account below is limited to industrial policy discussion to highlight the basic character of this policy dialogue within the limited space. The focus of the joint industrial studies shifted gradually in response to the changes in the domestic and external conditions surrounding Vietnam.

In Phase 1, the current status of Vietnam's industrial sector and industrialization policy were reviewed, and the main issues were identified, with particular attention given to the capital-intensive industries. To assist the Vietnamese government that lacked practical knowledge for industrialization but was keen to pursue it, the successes and failures of other countries were reported and conditions necessary to avoid investment failures were spelt out. This included the examination of industrial structure, product types, expected profit margins and costs, technical options, domestic demand and supply, and planned investments in neighboring countries that might compete with Vietnam, for each targeted industry. By providing these facts and data, the Japanese team tried to help the Vietnamese policymakers to evaluate with scientific evidence the feasibility of their planned investments.

Phase 2 added the perspective from the international and regional economic integration in which Vietnam was engaging such as the ASEAN Free Trade Area (AFTA), the Asia–Pacific Economic Cooperation (APEC), and the World Trade Organization (WTO). Among these, AFTA was the most imminent and binding issue for Vietnam. It required Vietnam to lower tariffs to the 0–5% range by 2006 for products included in the Common Effective Preferential Tariff (CEPT) schedule. The Ishikawa Project continued to study specific industries with expanded coverage. At the request of the Vietnamese side, the automotive industry, and industries with high export potential—electrical and electronics, tool and die, textile and garment, and ship repair—were

added to the original list of five capital-intensive industries. The Vietnamese government was also assisted to understand the concrete commitments required by AFTA, the policy measures permitted for industrial promotion and those that were prohibited, and what shape industrial policies should take before and after 2006. The Japanese team reiterated the need to have credible long-term industrialization scenarios and even suggested some scenarios for targeted industries with updated information and analyses, knowing that Vietnam's policy scope would become narrower under the AFTA commitments.

In Phase 3, additional sectoral studies were conducted, and the industrialization scenarios were elaborated. Information on ongoing and planned investments in neighboring countries was updated. FDI attraction became a core issue as multinational corporations were establishing and rearranging international and regional production networks. It was pointed out that Vietnam's negotiations for WTO accession and AFTA-CEPT trade liberalization were not consistent with the industrialization strategies of the key industries. The latter had to be more concrete with a roadmap to show when targeted industries were expected to become competitive and self-standing. Policy to attract large FDI projects must also be timed properly to the trade liberalization schedule.

5.4.4 Industrial Policy Controversies and Japan's Position

There were controversial arguments surrounding industrial policy in general and Vietnam's heavy industry drive in particular. They were the issues regarding horizontal and vertical industrial policy, stance toward regional and global economic integration, and the infant industry argument.

5.4.4.1 Horizontal Versus Vertical Industrial Policy

An industrial policy that affects all sectors such as improving the business climate, SME support without specifying sectors, and general education and training is called horizontal, and an industrial policy targeting specific sectors is called vertical. Vietnam had a strong vertical orientation toward heavy and chemical industries. However, these industries required huge capital investments but generated relatively few jobs in a country where labor was abundant, and capital was scarce. Such investments were therefore very risky for Vietnam. The Japanese team noted the following three facts. First, historically, almost all industrialized countries had employed protection policies to foster heavy and chemical industries. Second, given the population size of Vietnam, it was not realistic to advise Vietnam to abstain from having any capital-intensive industries in the future. Third, the Vietnamese government was determined to develop capital-intensive industries no matter what the Japanese team said, and the best thing that Japan could do was to help avoid serious mistakes in such investments [13].

The Japanese team was greatly concerned about the technical and financial appropriateness of each investment plan. It advised Vietnam to first get a better understanding of the specific industries it wanted to develop by studying the appropriate type, timing, and scale of investment as well as reliable forecasts of domestic and international demand. Macroeconomic stability was also needed for the success of large projects. With these preparations, Vietnam should be able to make prudent judgments about large projects and minimize the risk of costly failures [13].

By giving conditional approval and much-needed analyses, the Ishikawa Project escaped the simplistic and diametrical debate on horizontal versus vertical industrial policies. It did not reject the aspiration of the Vietnamese government for heavy industrialization, nor did it encourage it unconditionally. Meanwhile, the horizontal perspective was not overlooked. The importance of creating a favorable business environment for all firms was stressed throughout the three phases. Interviews were organized with foreign investors to identify the bottlenecks in FDI attraction. Support for SMEs and indigenous industries was also discussed during Phases 1 and 2.

5.4.4.2 Global and Regional Integration

Vietnam had no choice but to join the international and regional economy. However, economic integration was fraught with risks as well as opportunities for developing countries. Ishikawa emphasized the need to properly evaluate the pros and cons of global and regional economic participation. As Vietnam was the latest comer in the existing international frameworks, it faced more serious challenges than the early joiners.

Specifically, the policy circumstances changed considerably from the 1960s to the 80s when the first batch of ASEAN countries was industrializing. The permitted policy scope became narrower as the global development trend shifted and the WTO began to impose stricter rules. For the early comers, the standard policy sequence was to start with import substitution which gradually shifted to export orientation. However, in the 1990s when Vietnam started industrialization, the international policy community was more 'neoclassical' and did not look kindly on selective protection policies even to promote exports, let alone import substitution.

The Japanese team provided theories and data needed to design a proper integration plan. The requirements of AFTA, APEC, and WTO were explained. The trade creation effect and the trade diversion effect were lectured, and the dynamic externality and the disciplining effect of free trade were explained. The infant industry argument was deepened by studying the Mill-Bastable criterion, market failures, government failures, and the criteria for priority industry selection. The experiences of Japan, China, and the ASEAN neighbors were compared. Many policy papers were written by Japanese economists for these purposes.

Vietnam had three options. The first was to strictly follow the tariff reduction schedule of AFTA in both letter and spirit. The second was to find the maximum number of loopholes to actively implement infant industry promotion. The third was a hybrid approach that combined the first two by devising policy space for selected

sectors only but faithfully following the trade liberalization rules for other sectors. Ishikawa recommended the third option. As explained above, Japanese experts delivered many lectures to share the knowledge of AFTA, APEC, and WTO, the advantages and disadvantages of Vietnam's participation in these frameworks, and other theoretical considerations. The Japanese intention was to encourage Vietnam to craft a balanced integration strategy without going to either of the extremes of back sliding or jumping in without preparation [17].

5.4.4.3 The Infant Industry Argument

The infant industry argument was deliberated on mainly in Phase 2. Under the AFTA framework, each member country was to classify products into three categories: the Inclusion List (IL) with tariff rates of 5% or lower, the Temporal Exclusion List (TEL) with delayed execution, and the Exclusion List (EL) for a few items to be protected permanently. However, all items in TEL had to be moved to IL following the committed tariff reduction schedule. For Vietnam, IL initially included 857 items (39.1%) and TEL 1,189 items (54.2%). The question was at what speed Vietnam should complete conversion from TEL to IL. If this was done too rapidly, there would be little scope for infant industry promotion. If too slow, Vietnam's move toward free trade and active competition would be significantly delayed.

The Ishikawa Project advised against rapid trade liberalization without preparation. It strongly recommended that the long-term strategies for industrialization in general and specific industries in particular, with trade liberalization as one of their key components, should be formulated as Vietnam proposed the conversion schedule from TEL to IL. This would concretely define which industries were to be fostered as infants (with limited time given by AFTA) and which industries were to be exposed to international competition immediately [15]. The movement of automobiles from TEL to IL was one of the burning issues, and the Japanese team urged Vietnam to come up with a realistic strategy combining automotive promotion and trade liberalization. However, no such strategy emerged, and Vietnam's regional automotive tariffs were lowered to zero in 2018 without clear policy direction.

5.4.5 Characteristics of the Ishikawa Project

The implementation of the Ishikawa Project was guided by the Japanese development principles in general and Professor Ishikawa's personal beliefs in particular. Its characteristics included joint research, an attempt to deeply understand the internal situation of Vietnam, maximum respect for the will of the Vietnamese government, and attentive responses to Vietnamese inquiries and requests.

5.4.5.1 Joint Research

Joint research was practiced in the entire Ishikawa Project. Japanese researchers and experts and Vietnamese policymakers worked together. All related tasks, including the analysis of the current situation, the setting of policy goals, and the interviews of domestic and foreign firms, were conducted jointly. Moreover, the policy option approach was adopted where both sides cooperated to draw up multiple industrialization scenarios by identifying possible options and examining the pros and cons and political, economic, and social implications of each option while leaving the final decision to the Vietnamese side. Policy proposals were thus jointly created instead of the Japanese side unilaterally recommending the solution it considered best for Vietnam.

Take the development of the steel industry scenario in Phase 2, for example. First, the current situation of Vietnam's steel industry was researched. Then, the features and possible problems of blast furnace mills which Vietnam was eager to build were studied including the current and future steel demand and planned investments in neighboring countries. Finally, multiple technical options for steel mill construction were carefully examined including blast furnaces, the direct reduced iron (DRI) method, electric furnaces that used imported scrap iron, and rolling mills that used imported billets. All these steps were carried out bilaterally through extensive discussion with Vietnamese industrial officials and the CEOs of the Vietnam Steel Corporation.

5.4.5.2 Understanding Internal Constraints and Respecting the Will of the Vietnamese Government

Vietnam had to operate under certain domestic constraints. They included economic management dictated by Communism, enthusiasm for industrialization, and various internal pressures on policymakers within the ruling system. Vietnam as a developing and transitional economy faced many technical challenges, including the need to define an appropriate long-term development path under the domestic and external circumstances surrounding the country.

The Japanese team accepted these constraints Vietnam faced with care and sympathy. The will of the Vietnamese leaders in setting the national agenda, choosing policy issues to be discussed, and what they desired to learn, were accepted in principle. There were some policy agendas the Japanese side could not support wholeheartedly, but even in such cases, they were accepted conditionally and within certain bounds. Opposing views, if any, were expressed softly and diplomatically. The case of heavy industry targeting was already explained in detail above. Ishikawa said:

> The approach adopted by the World Bank is a theoretical one based on the economic theories developed from the experiences in countries with well-developed market mechanisms. The Japanese team was skeptical about the simple application of those theories. It is essential to study and understand the situation in Vietnam first. This can be named the empirical approach. [19]

It was considered essential to avoid dogmatic arguments and deal with controversial issues practically and realistically without driving Vietnam into a corner. The importance of objective scientific analysis was stressed. Even when there seemed a conflict between Vietnam's policy eagerness and Japanese economic interests, an impartial position was maintained by the Ishikawa Project stressing intellectual cooperation. To convince the Vietnamese policymakers, Japan took the position of the sun in *Aesop's Fable of the North Wind and the Sun*.

5.4.5.3 Responses to Inquiries from the Vietnamese Side

The Vietnamese counterparts in the Ishikawa Project asked many questions to the Japanese side. Most originated from the Politburos of the Central Communist Party. Some of them were ongoing controversies within the government and others were challenges coming from bilateral and multilateral donors. Vietnamese policymakers were under strong pressure to react to them in a timely and appropriate manner, and often turned to Japanese researchers for initial ideas and advice. Professor Ishikawa and his team responded to each of these inquiries with seriousness and sincerity via direct meetings, emails, and facsimiles [19].

5.4.6 Achievements, Lessons, and Remaining Issues

The impact assessment of policy dialogue is difficult when many issues are discussed, many donors are involved, policy adoption is up to the learning government, and most results are long-term and depend on many internal and external factors besides policy. Tangible short-term outcome cannot—and should not—be expected. In drafting FYP6, for example, many Vietnamese officials were involved, and they received multinational and bilateral cooperation from organizations and projects other than Japan's Ishikawa Project. It is impossible to separate the influence of one cooperation project from those of others on the resulting plan. However, there were some exceptional cases where the Ishikawa Project almost certainly made differences in the policy content and the policy learning process of the Vietnamese government.

5.4.6.1 Impact on the Vietnamese Government

One such incident occurred at the outset of the project when Professor Ishikawa lectured to the Politburo members on September 1, 1995. He suggested that (i) the growth target of FYP6 exceeding 10% should be lowered to avoid inflation and balance-of-payments difficulties; (ii) agriculture and rural development needed more emphasis; (iii) domestic savings must be increased; and (iv) the SME and indigenous industrial sectors needed to be developed along with the FDI sector. These suggestions were seriously considered by Politburo. General Secretary Do

Muoi personally informed Professor Ishikawa that the growth target was reduced to the 9% range following the professor's advice.

The subsequent joint research had two effects on the Vietnamese policymakers. The first was the formulation of Vietnam's transition roadmap from plan to market. The reform packages proposed by the IMF and the World Bank focused on macroeconomic stabilization and structural reform. The ideas for creating a market economy and the long-term perspective for nurturing the real sector, which were missing there, were supplied by Japanese economists. Second, the method to design sectoral promotion strategies was also demonstrated by the Ishikawa Project through time-consuming micro-level firm surveys, which were distinctly different from macroeconomic data analysis and the policy templates used by international organizations [9]. Vietnam was able to build its development approach by studying these two policy thoughts.

Ishikawa advised Vietnam, a country in an early industrialization stage, to follow the common path of East and Southeast Asia. Low-tech, labor-intensive, and export-oriented industries should be promoted first which were later to be replaced by more high-tech labor-intensive industries. FDI would play an important role in this process. Global and regional economic integration, especially AFTA, should be committed to and implemented from this perspective. As explained above, the Ishikawa Project prompted consideration of various risks, deflated unrealistic plans, and modified policies for more realism.

5.4.6.2 Lessons for Japan

The Ishikawa Project influenced the design of JICA's subsequent industrial policy dialogue projects in other countries. It became clear that, for successful policy dialogue, certain conditions had to be satisfied. First, the dialogue must be strongly needed and committed by both the learning government and Japan, and it should be started only in countries where such 'inevitability' and passion for mutual exchange were confirmed. Second, building trust is essential not only between two governments but also personally between the top leader of a developing country and the leader of the Japanese team. Professor Ishikawa was highly respected by Communist Party General Secretary Do Muoi, his successor Le Kha Phieu, and other Vietnamese leaders.

Third, the policy dialogue must be open and transparent. There is political sensitivity in any high-level policy discussion, but results must be disclosed as much as possible. The Vietnamese government was initially reluctant to publicize what was discussed between Vietnam and Japan, arousing concern among the World Bank and the IMF that suspected that Japan was urging large and costly industrial projects and import protection to Vietnam. Such misunderstanding gradually melted, especially during Phase 2, as Japan made the utmost effort to explain what it was doing and also asked the Vietnamese government to be more open. The representatives of the World Bank and the IMF were invited to the workshops in Hanoi and Tokyo, and the Japanese team met these organizations on every visit to Vietnam.

Fourth, donors must understand not just economic statistics but also the political, diplomatic, and administrative constraints of the receiving side of intellectual aid. To advise a policy change, it is often more effective to sympathize with the confused leaders and officials, spend sufficient time with them to share their worries, and propose possible options without pushing them too hard. Advice should be offered as multiple choices accompanied by the advantages and disadvantages of each, leaving the final decision to the host government, rather than proposing one-size-fits-all solutions without checking their local suitability. The output of policy dialogue should be published in a form easily readable for busy policy leaders who want concrete advice on the burning issues of the day, not economic journalism or academic papers. To assess the validity of policy dialogue, long-term shifts in the nation's policy quality, as well as the bilateral relationship, are more important than the tangible numbers and quick evidence which normal projects require.

5.4.6.3 Shortcomings

Despite its achievements, the Ishikawa Project also had a few problems. One criticism was directed at the size of reports and their languages. Each phase of the Ishikawa Project produced many thick reports, in Japanese and English but not in Vietnamese, without indicating where to start reading and what the main conclusions were. They simply assembled the writings of all researchers and experts. When put together covering all phases, the Japanese reports spanned 33 cm from side to side. National readers do not read thick reports, especially when they are written in a foreign language. JICA did not produce Vietnamese editions because that was officially the responsibility of the Vietnamese side. The project should have published one or a few flagship reports of reasonable size containing key analyses and policy recommendations with careful editing, nice design, and vivid colors—as virtually all donors and international organizations do—in three languages.

A related problem was the lack of an effective dissemination strategy at the time. As noted above, the Vietnamese authorities were initially reluctant to disclose the content of the bilateral policy discussion and this was one reason why the dialogue was not known by the rest of the Vietnamese government and citizens, the Japanese government, or the international investor and donor community. Neither JICA nor the other participating members systematically publicized their activities to an external audience, and this was another reason for their low exposure. Nowadays it is customary for any international cooperation to organize launching events, workshops, policy sessions, etc., and publish detailed content on the website and through SNS.

Problems were also found in the choice of research partners. The Ishikawa Project designated Ministry of Planning and Investment officials as the research counterpart of Japanese professors and consultants. However, government officials, unless they are specially trained, are usually unable to write research papers, conduct firm surveys, or present findings effectively. Old Vietnamese officials could give long speeches but had never learnt policy research methods. It would have been

better if Vietnamese researchers were mobilized from universities and research institutes to advise their government, with Japan helping to improve their performance. The Japanese development consultants also had limits in their dialogue capacity. They were able to conduct standard surveys but not policy dialogue with a foreign government which required knowledge of development economics and diplomatic skills.

As a result of these shortcomings, the cost-effectiveness of the Ishikawa Project may be questioned. It mobilized two large Japanese consultant firms which took up the bulk of the allocated dialogue budget. It also hired Japanese university researchers on a cost basis to conduct research, surveys, workshops, and conferences. There should have been clear project goals and fewer people carefully selected to execute the dialogue and research more effectively. The budget, staff, and strategies for disseminating the results should also have been prepared in advance.

5.5 Ethiopia, 2008-Present[7]

5.5.1 A Low-Income but Rising Country

With a per capita income of 936 USD as of 2020, Ethiopia remains a low-income country, though a rising one, with a weak private sector, imperfect policy, and poor business conditions. Nevertheless, it embraces a high aspiration for national development and has in the last two decades pursued a development strategy unique in Africa. Prime Minister Meles Zenawi (in power 1991–2012) in his later years and Prime Minister Hailemariam Desalegn (in power 2012–2018) adopted a developmental state model that actively guided and selectively promoted industrial activities. For this purpose, the Ethiopian government sought policy lessons from East Asia while rejecting the neoliberal doctrine of the World Bank and the IMF. Korea first and Japan later were consulted in formulating industrial strategies and concrete policy actions including export promotion, *Kaizen*, and FDI attraction. The construction of power and transport infrastructure also progressed rapidly, often with the support of the Chinese and other bilateral and multilateral partners. From around 2008, foreign investment in light manufacturing began to pour into Ethiopia. The government responded by building a large number of state-owned industrial parks as their receivers. By the late 2010s, Ethiopia had emerged as a dynamic latecomer economy featuring a developmental philosophy, policy effort, and growth performance that resembled those of East Asia's past and present latecomers rather than its African peers.

Despite these achievements, Ethiopia's economic transformation has been slow. Targeted and subsidized manufacturing subsectors such as garment, leather, and food

[7] Substantive policy discussions between Ethiopia and Japan began in July 2008, and the policy dialogue project was officially launched in May 2009. The project is continuing in its third phase at the time of writing this chapter (July 2022) and expected to be completed in the first half of 2023.

processing remain small and stagnant. The manufacturing sector remains small, and its GDP share fluctuates between 4 and 6%. Active promotion of key subsectors has not produced a visible increase in manufactured exports. Exports continue to be dominated by primary commodities such as coffee, sesame, oil seeds, chat, and gold. The overall export trend is flat, and the trade balance is perpetually in huge deficit. These disappointing results are in sharp contrast to the historical experience of high-performing economies in East Asia where rapid rises in manufacturing output and export were attained and economic transformation proceeded rapidly. This lack of industrial performance constitutes a serious challenge for Ethiopia. Moreover, the Abiy administration which came to power in 2018 has faced many serious problems including worsening political instability across ethnicities and regions, internal war with Tigray, withdrawal of US trade privileges over human rights concerns, and economic slowdown coupled with rising inflation and an aggravated foreign currency shortage.

5.5.2 The Evolution of Industrial Policy

Ethiopia's industrial policy has evolved dynamically in the last three decades as policy goals and the economic landscape changed. Under the government of the Ethiopian People's Revolutionary Democratic Front which took power in 1991, policy attention shifted gradually from building a new nation and the resuscitation of the suppressed private sector to promoting economic development and structural transformation. According to then Prime Minister Meles, it was around 2002–2003 that the Ethiopian government judged that the issues related to national survival were largely under control, and that time had come to turn seriously to economic development. A series of strategic documents were drafted including the Ethiopian Industrial Development Strategy, the Urban Development Strategy, and the Rural Development Policies, Strategies, and Instruments.

Ethiopia began to learn about East Asia's developmental experiences from documents and by sending young officials to the Korea Development Institute (KDI) School in Seoul. Prime Minister Meles himself participated in international conferences and research projects on industrial policy. He also spent much time meeting with foreign researchers and investors and exchanging letters and emails with them. As a result of initial learning, the monthly National Export Steering Committee, copied from Korea, was established in 2003 and used actively to monitor progress in export promotion [31]. Separately, directorates and institutes were established to support specific sectors such as textile, leather, metals, and horticulture. These sectors received considerable policy attention, budget allocation, and donor support. Productivity tools including balanced scorecards, business process re-engineering, benchmarking, and institutional twinning were also introduced, often with donor support. None of these, however, had a lasting impact on growth performance or economic transformation.

In 2008, an industrial policy dialogue with Japan was started. In 2009, JICA began to cooperate in the introduction of *Kaizen*, a Japanese method to improve workplace efficiency. At the same time, through Ethiopia's energetic top sales effort and investment promotion, labor-intensive manufacturing FDI began to arrive in Ethiopia from Turkey, India, China, and others. Foreign manufacturers were attracted mainly by Ethiopia's low-cost labor, privileged access to the European Union (EU) and United States (US) markets, and the government's industrial support and commitment even though the general investment climate remained far from satisfactory. Ethiopia thus emerged as one of the favored destinations for light manufacturing. The net inflow of FDI to Ethiopia increased sharply from virtual nil during the 1970s and 80s to 17 million USD in 1994 and peaked at 4.1 billion USD in 2016 (World Bank data). However, the FDI inflow became unstable after 2017 due to various domestic and global woes, and the volume is still small compared with the massive and continued FDI inflows into East Asian economies.

As the prospect of FDI-led industrialization emerged, the government introduced several policy initiatives to seize this opportunity. FDI policy has been liberalized in steps and centrally managed by the Ethiopian Investment Commission (EIC). State-run industrial parks and the Industrial Park Development Corporation (IPDC) were created, and a one-stop investor service was adopted. The Hawassa Industrial Park specializing in textile and garment became Ethiopia's flagship industrial estate which quickly attracted many FDI projects [31]. Other parks specializing in agro-processing and SMEs are also under preparation, and a large integrated steel mill and a petrochemical complex are being planned. However, the quality and productivity of industrial workers have become critical issues. Meanwhile, aggressive public investment programs built hydraulic power plants, expressways, railroads, airports, etc. often with the support of China and other donors. This has however caused rising inflation and a serious balance-of-payments crisis.

While coping with these macroeconomic problems, the Abiy government accelerated state enterprise reform by selling—or planning to sell—such enterprises and/or introducing competition. Meanwhile, the long-term development vision and action plans for industrial promotion were slow to emerge. Sufficient details were not given in such key policy documents as A New Horizon of Hope (Spring 2019), the Homegrown Economic Reform Agenda (September 2019), and the Ten Year Development Plan (approved in March 2021). To fill this gap, the Ministry of Industry began to revise the Industrial Development Strategy of 2002 and launched the National Industrial Movement in 2022.

5.5.3 Systematic Learning from Japan and East Asia

In May 2008, Japan hosted the Fourth Tokyo International Conference on African Development (TICAD IV) in Yokohama, inviting 40 African heads of state including Prime Minister Meles. Subsequently, in July 2008, Professor Joseph Stiglitz of

Colombia University organized the third Africa Task Force meeting of the Initiative for Policy Dialogue, which was financially supported by JICA, in Addis Ababa. Prime Minister Meles attended most sessions of this meeting where the Japanese presenters from National Graduate Institute for Policy Studies (GRIPS) explained the concept of Dynamic Capacity Development and the East Asian way of learning-by-doing [26]. The GRIPS team also offered a book on East Asian lessons for African growth to the prime minister which contained a chapter on JICA's *Kaizen* cooperation in Tunisia[8] (see Chap. 7). In the following weeks, Prime Minister Meles requested to the Japanese government two-part bilateral industrial cooperation consisting of a quality and productivity (*Kaizen*) project, just as JICA had provided in Tunisia, and regular policy discussion with GRIPS. Prime Minister Meles explained that TICAD IV and discussion with GRIPS researchers had convinced him that the time was ripe for direct intellectual exchange with Japan, the country that led the East Asian miracle. In 2009, Japanese industrial cooperation with the two requested components was officially launched.

Ethiopian participants in the bilateral industrial policy dialogue were many and multi-layered, including Prime Minister Meles himself, and economic cabinet members. On the Japanese side, GRIPS and JICA jointly managed the policy dialogue with the additional participation of the Ministry of Foreign Affairs, the Ministry of Economy, Trade, and Industry (METI), and the Japan External Trade Organization (JETRO). The high-level policy dialogue was held four times a year, supplemented by a large number of research projects, additional mutual visits, exchange of policy letters, and research missions to third countries in Asia and Africa [4, 5]. Prime Minister Meles (from 2008 to 2012) and Prime Minister Hailemariam (from 2012 to 2017) participated in high-level discussions with zest and seriousness. 18 such sessions, usually lasting one to two hours, were arranged with these prime ministers. Separately, 19 High Level Forums with ministers, state ministers, officials, and experts were held in Addis Ababa. Besides these, there were numerous visits to offices, factories, and project sites; discussions with international organizations and other bilateral donors; regional trips inside Ethiopia and Japan; and invited lectures at ministries and universities. 19 policy research visits to third countries in Asia and Africa were organized (not counting mutual visits between Ethiopia and Japan).

Meetings with the national leaders were used not only to convey requested knowledge to Ethiopia but also to test and propose new policy areas that were missing but considered necessary by the Japanese side. Some topics were directly suggested by top leaders and senior policymakers while others emerged from operational-level discussions. Sharing of policy knowledge was mutual rather than unilateral from Japan to Ethiopia because Japan also had to learn about Ethiopia's policy intentions. Discussions were not confined to the experiences of Japan or the countries that Japan had assisted to develop. A large number of concrete cases were drawn from Asia and

[8] *Kaizen* is a Japanese word for improvement, which means continuous improvement in quality and productivity with the participation of an entire company to establish a spontaneous and permanent process of eliminating *muda* (any thing or action that adds no value to the product, often translated as waste). *Kaizen* requires enthusiasm, teamwork, and persistence but not large investment in capital equipment.

Africa. Industrial officials and experts from Malaysia, Thailand, and Vietnam were invited to present their practices and research.

Dialogue modality changed in 2018 with the inauguration of Prime Minister Abiy who had a different governing style from his predecessors. He left economic management to the Macroeconomic Team consisting of high officials of the Prime Minister's Office, the Ministry of Finance, the National Bank, the Ministry of Planning and Development, and the Ethiopian Investment Commission instead of personally directing policies by himself. The Japanese team began to meet selected members of the Macroeconomic Team on such concrete issues as productivity, automotive assembly, FDI policy, and the apparel sector.

The prominent features of the Ethiopia-Japan industrial policy dialogue are as follows. First, many of the proposed policy actions were actually adopted, either partially or fully, by the Ethiopian government. Second, from the beginning, Ethiopian leaders wanted Japanese researchers to be direct and frank rather than polite and diplomatic, and discussion has always been held in this spirit. Third, the Japanese side often stressed quality over speed in policymaking, an idea which Ethiopians did not accept. This different stance over policy speed was never resolved, and Japan accepted this tension as a given. Fourth, topics were selected carefully and interactively a few months prior to the discussion to identify the burning issues of the day rather than deciding on many topics in advance. Fifth, Japanese resources and industrial projects were mobilized to realize some—but not all—of the proposals made during dialogue sessions, so talk led to action instead of remaining just talk. This made both parties more serious and committed to the policy dialogue. Sixth, past East Asian experiences have increasingly become pertinent to Ethiopia as it focuses on skills, productivity, value creation, and attracting high-quality manufacturing FDI. Seventh, Japanese policy support has been conducted within a broader network of private and public actors from Japan and other advanced or emerging economies because, unlike in Southeast Asia, Japan is a small player in Africa and cannot achieve its cooperation purposes by bilateral efforts alone.

It is also important to recognize that Ethiopia is learning from many nations, not only from Japan or East Asia. Many bilateral and multilateral development partners are active in Ethiopia. Two things can be said about this. First, while virtually all donors now engage in industrial support unlike in the years past, most newcomer donors have little ground knowledge of industries and rely heavily on consultants, NPOs, and matching funds for project implementation. This is not the case with JICA or German Corporation for International Cooperation (GIZ), both of whom have extensive hands-on experience in industrial promotion around the globe. Second, Japanese industrial cooperation stresses quality, productivity, competitiveness, and other product-related aspects while Europeans and Americans are focused more on labor, social, and environmental correctness. This difference is clearly visible in the apparel sector of Ethiopia [27]. Ethiopia needs to understand this difference among the donor groups and needs to learn from both.

The most essential element of the Ethiopia-Japan industrial policy dialogue has been the seriousness and eagerness of Ethiopian national leaders to learn from East Asia. The learning proceeded under strong country ownership and was followed up by actions to realize the localization of foreign models by both sides.

5.5.4 The Dialogue Agenda

In the first phase of the Ethiopia-Japan Industrial Policy Dialogue (2009–2011), the two sides deepened their knowledge of each other. The Ethiopians explained their policies such as Agricultural Development Led Industrialization (ADLI) and the current and future five-year plans while the Japanese team explained how East Asia and the rest of Africa designed and implemented policies and how they made necessary institutional arrangements for policy coordination. The Ethiopian government was deeply interested in the practical aspects of strategy formulation. The Japanese side responded by offering an international comparison of industrial master plans with close attention to drafting methods and stakeholder consultation. Prime Minister Meles additionally requested detailed information on many industrial subjects he wanted to investigate, and they were compiled and sent to him (Fig. 5.1).

As Japanese *Kaizen* cooperation started simultaneously with policy dialogue, much time was spent on how *Kaizen* should be localized and expanded in Ethiopia. Separately, in response to another Ethiopian request, Japan and Germany conducted a joint survey on the current status of the Ethiopian basic metal and engineering industries. The advice was also given on the preparation of the next five-year development plan (Growth and Transformation Plan I, 2010/11–2014/15). Many ideas were offered, including quality and productivity targets, but the final document

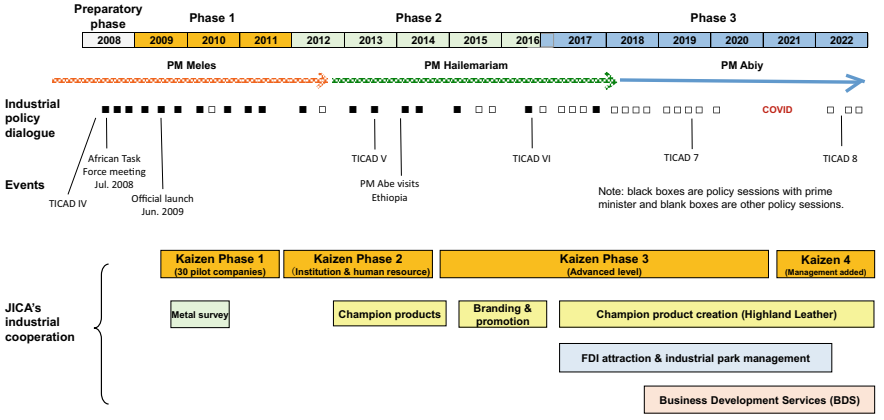

Fig. 5.1 Ethiopia and Japan: policy dialogue and industrial cooperation (*Source* Elaborated by the author)

contained none of these. This was questioned by the Japanese side, and the Ethiopian leaders subsequently promised that this would not happen again. In April 2013, Prime Minister Hailemariam requested that the GRIPS team continue to assist in the formulation of the next five-year plan (Growth and Transformation Plan II, 2015/16–2019/20).

The second phase (2012–2015) began with a proposal to enhance export promotion. This was to be done through the creation of culture-laden, high-quality champion products with new branding (for example, Ethiopian Highland Leather). JICA's project was launched, and Ethiopian private firms enthusiastically welcomed the idea of champion products. Japan intended to broaden the scope of Ethiopian policy from *Kaizen*, which dealt with supply-side efficiency, to demand-side and customer orientation which had hitherto been missing. Another important theme was improving FDI policy and industrial park operation as manufacturing FDI was accelerating in Ethiopia. International experiences and JICA's standard cooperation package in this area were explained. In 2013, a large Ethiopian delegation, headed by a State Minister of Industry and including a person who was later appointed as the Ethiopian Investment Commissioner, was dispatched to Malaysia to learn FDI and export promotion methods. In Addis Ababa, other related issues such as one-stop investor service, SME handholding support, and FDI-local firm linkage creation were also discussed.

The Japanese team also advised on the proposed content of GTP II as requested by Prime Minister Hailemariam. Unlike the previous plan, many recommendations made it to the final document including the light manufacturing vision, the *Kaizen* philosophy and targets, and extensive use of the phrase 'quality, productivity and competitiveness (QPC)' throughout GTP II. However, the Ethiopian government was not yet sure what this phrase would entail in terms of concrete policy measures and requested Japan's further cooperation [4].

The third phase starting in 2017 turned to productivity and the attraction of Japanese FDI as core issues. The important link between labor productivity and wages and relevant Asian experiences had already been discussed in the second phase. Additionally, Ethiopia's past productivity tools—*Kaizen*, benchmarking, and twinning—were critically assessed; the manufacturing census database was checked, cleaned, and re-formulated into a panel dataset; and an apparel sector survey was conducted in Bole Lemi, Hawassa, and Mekelle. These works led to the joint drafting of the Ethiopia Productivity Report by the Policy Studies Institute (PSI), a government think tank recently created by merging two existing institutions, and the GRIPS Development Forum in 2020. This was Ethiopia's first scientific research applying standard analyses to Ethiopian productivity such as TFP and two decompositions of labor productivity growth, which identified both achievements and challenges. The deep involvement of Ethiopian researchers in industrial policy dialogue as well as productivity research was another feature in the third phase. This report was followed by another PSI-GRIPS joint research on the Ethiopian FDI Policy Report in 2022.

The policy dialogue team also assisted Japanese investors interested in Ethiopia by offering policy information, organizing workshops with key Ethiopian officials, and providing the Ethiopian government with concrete policy advice to bring and retain Japanese and other investors. It is hoped that Ethiopia would recognize and prepare

conditions conducive to high-quality FDI, and Japanese investors in turn would have a deeper understanding of Ethiopia's policy and build a fruitful relationship with the host country. Japanese automotive and apparel firms were assisted by this mechanism. The investment project in the automotive sector is ongoing but the one in the apparel sector was suspended due to the eruption of an internal war in Tigray. Thus, policy dialogue grew to cover wide policy areas combining talk with official cooperation projects and the business actions of Japanese firms. JICA provided an array of industrial cooperation projects in Ethiopia including policy dialogue, advanced *Kaizen*, industrial park management, investment promotion, export promotion, business development service (BDS), start-up business competition, and support for Japanese SMEs interested in Ethiopia. For JICA, this is the broadest industrial cooperation package in Africa, similar to those offered to latecomer countries in Southeast Asia.

An additional remark on *Kaizen* is warranted. Policy dialogue initially discussed various practical aspects of *Kaizen* including transferability from Japan to Ethiopia, compatibility with other productivity methods, and the incentivization of Ethiopian *Kaizen* consultants. But as experience and knowledge accumulated, day-to-day management and troubleshooting were delegated first to JICA experts, then to the Ethiopian Kaizen Institute (EKI) which was strengthened by JICA experts. Ethiopians became able to not only manage domestic *Kaizen* activities but also teach *Kaizen* to other Africans bilaterally and through the African Union Development Agency-New Economic Partnership for Africa's Development (AUDA-NEPAD). Even so, both Prime Minister Meles and Prime Minister Hailemariam continued to be highly concerned about the sustainability of *Kaizen*. To them, *Kaizen* should not be a convenient productivity tool to be forgotten quickly but an engrained national philosophy and mindset to be practiced endlessly.

5.5.5 Remaining Challenges

Apart from the lack of political and macroeconomic stability, which are prerequisites for growth in any country, the Japanese policy dialogue team identified the following three challenges in Ethiopia's development policymaking. First, despite recent high growth and much policy learning, Ethiopia is still a low-income country on a long journey to full industrialization. The private sector is weak and industrial policy remains unsophisticated by East Asian standards. Such weaknesses are visible in the low labor skill and discipline, low productivity, and the stagnant output and trivial exports of the manufacturing sector. The business climate is very unfavorable. Development policy must be drafted in a pragmatic way to overcome this reality. Leapfrogging to the technology frontier is difficult unless the human resource is fostered, and basic institutional foundations are laid first.

Second, technocrats must be strengthened. Top leaders are dedicated to national development but extremely busy. Below them, there is only a thin layer of competent middle officials in ministries and development agencies, a situation that prevents effective policy formulation and implementation. Ethiopian policies are often made hastily without deep consideration of appropriate design or suitability to Ethiopian reality. Speed is stressed over quality. Detailed fact-finding surveys necessary for policy formulation are often skipped or unheeded. In high-performing East Asian governments, policies are created interactively in both top-down and bottom-up directions. In Ethiopia, such interaction does not occur as competent technocrats are few. Bold administrative reform is needed to significantly boost the capacity and salaries of government officials while reducing their number.

Third, Ethiopia's industrial growth is taking place in Africa where conditions are quite different from East Asia. The principal difference is the absence of the regional *flying geese pattern* where a leading nation (which used to be Japan) generates structured layers of followers (Taiwan, Korea, Southeast Asia, China, etc.) through dynamic intra-regional trade, investment, aid, human exchange, and technology transfer. Despite many regional mechanisms and the inauguration of the African Continental Free Trade Area (AfCFTA) in 2021, Africa generally lacks such intra-regional linkages in substance. This implies that Ethiopia must industrialize as a solitary bird, directly facing the pressure and competition of the global economy without intra-regional cover, linkage, or learning models. This calls for adjustments in adopting East Asian lessons, especially regarding the formation of a foreign partnership in global marketing and knowledge transfer.

5.6 Thailand, 1999[9]

5.6.1 The Situation Before the 1997 Crisis

The case of Thailand is different from the other three cases because Japanese cooperation was provided in response to a severe economic crisis that demanded quick action, and also because Thailand and Japan had very close economic ties with the thousands of Japanese firms operating in Thailand[10] that played an important role in the provision of support.

From the early 1970s, Thailand continued to industrialize even with occasional setbacks [8]. The manufacturing share of GDP rose from 13.0% in 1961 to 25.9%

[9] 1999 was the year in which Japan's crisis response support culminating in the Mizutani Report was conducted. Additional and related Japanese cooperation was extended both before and after 1999 as this section explains.

[10] In April 2022, the Japanese Chamber of Commerce in Bangkok counted 1,642 member firms. Some Japanese FDI firms operating in Thailand have not joined this chamber.

in 1996. Thanks to a generally open and favorable business environment, Thailand became a popular investment destination for foreign enterprises including the Japanese. Pushed by a large appreciation of the Japanese yen from 1985, many Japanese manufacturers, including carmakers, came to Thailand to establish new production sites [6]. By the early 1990s, automotive production in Thailand had exceeded 500,000 units. However, the Thai economy suffered from structural vulnerability including high dependence on imported materials and components (this is called the absence of 'supporting industries' or domestic suppliers of materials and components) and persistent current account deficits. Moreover, the country faced increasing competition from China, Mexico, and other emerging economies. Even before the eruption of the Asian currency crisis (see below), its manufactured exports had begun to weaken.

In the 1950s, the Japanese government began industrial cooperation with Thailand and other Southeast Asian countries as Japanese enterprises became active in the region. JICA's industrial support for Thailand initially focused on hard technology such as metalworking and machining, but it gradually expanded to policy and institution areas such as export promotion and supporting industry development. In 1995, JICA published comprehensive recommendations for Thai industrial development, some of which were adopted by the Thai government. Most notably among them, the Bureau of Supporting Industry Development (BSID) was created under the Department of Industrial Promotion (DIP) of the Ministry of Industry (MOI) [16]. In the private sphere, the Technology Promotion Association (TPA) was founded in 1973 by former Thai students who studied in Japan to strengthen bilateral ties and spread Japanese-style manufacturing in Thailand [21]. TPA continuously offered various industrial services to Thai enterprises via training, publication, consultation, Japanese language courses, and the establishment of the Thai-Nichi Institute of Technology (TNI), a private university specializing in Japanese manufacturing technology, in 2007 (see Chap. 8 for TPA and TNI).

5.6.2 Responding to the Asian Financial Crisis

In July 1997, Thailand was hit by an acute currency crisis which prompted a huge and sudden withdrawal of the short-term foreign funds that had entered the country. International reserves were depleted, the baht depreciated by more than 50%, domestic demand collapsed, and production fell as much as 7.6%. The crisis quickly spread to the rest of Asia with Korea and Indonesia particularly hard hit. The IMF and the World Bank extended financial support to the crisis-ridden countries in exchange for fiscal and monetary belt-tightening actions. However, these policy measures designed to cope with traditional macroeconomic imprudence had the effect of aggravating the private capital-driven crisis which this situation was [35].

The crisis demanded decisive responses. Since the Thai government had been well aware of the structural vulnerability mentioned above, it quickly established the National Industrial Development Committee (NIDC) in August 1997 [34]. The

Subcommittee for Industrial Restructuring Plan under this committee formulated the Industrial Restructuring Plan (IRP) which was approved by the cabinet in early 1998. Its eight pillars were productivity, technological capabilities, labor skills, SMEs, marketing, rural development, FDI, and environment protection. The plan scope was up to 2002, and concrete annual implementation plans were made from 1999. Financial support was provided by the World Bank, the Asian Development Bank, and Japan.

IRP incorporated many recommendations JICA had offered. Its drafting was supported by a Japanese advisor from MITI who emphasized the importance of grasping the actual situation of Thai enterprises before identifying and helping viable enterprises to survive the crisis. The Thai government recognized that macroeconomic responses were not enough to address the real sector problems faced by individual sectors and enterprises. There were also political factors as the Thai Rak Thai Party led by Thaksin Shinawatra emphasized SME support, and MOI also hoped to increase its influence within the government.

The institutional setting for the industrial policy was also strengthened. As recommended by the JICA study in 1995, MOI drafted the SME Promotion Act and submitted it to the parliament in April 1999. The Act led to the creation of (i) the SME Promotion Committee and its secretariat office, (ii) the SME promotion fund, and (iii) the SME promotion action plans. Additionally, MOI, in collaboration with the private sector, established the Thai Automotive Institute (TAI) and the Electric and Electronic Institute (EEI) as new sectoral implementation agencies [16].

The Thai government compared the SME policies of many countries and decided to invite Japanese cooperation which focused on the real economy and the performance of individual firms in contrast to the macroeconomic framework approach of the World Bank and other international organizations. Thailand-Japan cooperation in SME promotion was agreed upon by Prime Minister Chuan and the Japanese Minister of Trade and Industry. It must be added that, during and after the crisis, virtually all Japanese FDI firms remained in Thailand without leaving, and they expected the Japanese government to support their local partner firms. The Japanese policy towards ASEAN also stressed strengthening all domestic industries (including SMEs) instead of just export firms. The following subsections present three concrete policy actions that Thai MOI took and to which Japan extended intensive support.

5.6.3 The SME Promotion Master Plan

The Japanese government pledged to support the ASEAN countries suffering from the economic crisis at the first ASEAN Economic Ministers-METI Economic and Industrial Cooperation Committee (AMEICC) meeting in November 1998. For Thailand, MITI dispatched Shiro Mizutani, a high-ranking MITI official and the former Representative of the JETRO Bangkok office, as an advisor to the Minister of Finance and the Minister of Industry. Between January and June 1999, Mizutani visited Thailand five times (55 days in total). Close to 100 Japanese experts were mobilized from

various SME-support organizations including the Japan Small Business Corporation, the Japan Small and Medium Enterprise Management Consultant Association (J-SMECA), and the Shoko Chukin Bank, a financial institution dedicated to SME finance. At the end of his mission, Mizutani submitted the draft SME Master Plan (the 'Mizutani Plan') to the Thai government. To support Mizutani's work, JICA conducted a follow-up survey and provided recommendations on the SME Master Plan as well as implementation plans for the newly established sectoral Institutes (TAI and EEI).

This cooperation had several characteristics. First, the mobilization of a high-ranking official such as Mizutani attracted strong and quick actions by the Thai side. Second, as this was a crisis response, work was done quickly in contrast to other policy dialogues which had a longer time horizon. Third, detailed information on Thai industries was collected by many Japanese experts which was supplemented by the data routinely gathered by the Japanese Chamber of Commerce in Bangkok. Fourth, based on the collected information, suitable Japanese models were selected and localized to fit the Thai context. Japanese experts did not simply copy and paste them. Fifth, due to the short duration, there was not enough time for the Thai counterparts to learn the policy technique or offer sufficient comments. The localization of the Japanese model was done mostly by Japanese experts.

The Mizutani Plan consisted of two pillars. The first pillar, 'measures for solving problems faced by Thai SMEs,' addressed such issues as finance, management, and technology for all SMEs. The introduction of the factory evaluation system was proposed as the precondition for implementing all other SME promotion measures. The second pillar, 'SME policies for realizing vigorous economic and social systems,' targeted specific segments of the economy. This reflected the Japanese idea that 'horizontal' (general) measures were not enough and that targeted 'vertical' measures, such as supporting industry promotion, were essential for industrial upgrading.

With these inputs from Japan, MOI drafted the SME Master Plan which was approved by the Cabinet in April 2000. While its contents basically followed the Japanese recommendations, the coverage was limited to SMEs in the manufacturing sector in keeping with MOI's jurisdiction [18]. There were some important details with local adjustment by the Thai side. For example, the comprehensive on-site technical guidance program proposed by the Mizutani Plan was not adopted in its original form. The Master Plan proposed the 'development of a consulting system for improving businesses and solving problems' which had a more general orientation (see also the next subsection). Meanwhile, coordination among stakeholders was stressed and business clusters were added as one of the seven strategies. Furthermore, the establishment of micro and small enterprise cooperatives in rural areas was included in MOI's Master Plan. This was an item deliberately deleted from the Mizutani Plan because the Japanese experts did not think it would fit the Thai reality.

In addition to Japan, other development partners may have influenced MOI's policy. The International Labour Organization (ILO) and the United Nations Development Programme (UNDP) jointly implemented the 'Micro and Small Enterprises Development and Poverty Alleviation in Thailand Project' which discussed many 'international best practices.' It advised business development services (BDS) to be

left to the private sector and SME policies to remain holistic and broad, to also include the informal sector, rather than selective and specific [2]. The World Bank conducted a large-scale enterprises survey and organized the SME Master Plan seminar. Thus, the World Bank did pay attention to the real economy in addition to the macroeconomic framework although its scope may have been more general than the Japanese. Domestically, a paper prepared by the Institute for Population and Social Research of Mahidol University raised questions about the appropriateness of target sector selection and urged the government to hear domestic voices in the formulation and monitoring of the Master Plan [33].

In February 2000, the SME Master Plan was approved, and the SME Promotion Act was promulgated which established the Office of SME Promotion (OSMEP) in November 2000. OSMEP was mandated to cover SMEs in all sectors including manufacturing, trade, and service. It was to formulate and monitor comprehensive SME Master Plans with detailed action plans. The Cabinet approved the first SME Master Plan by OSMEP in May 2003. It combined MOI's Master Plan, opinions of international and domestic stakeholders, and the policy direction of the Thaksin administration which came to power in 2001. In comparison with the Mizutani Plan, the OSMEP's Master Plan had the following features. First, while both plans had the two pillars of general measures and targeted measures, targeted sectors were different. The Mizutani plan targeted concrete industrial sectors while OSMEP specified targeted sectors functionally, including export enterprises and new enterprises. Second, the factory evaluation system was not discussed in the OSMEP Master Plan except in a very vague way. Third, OSMEP additionally emphasized the business environment for SMEs, public–private partnership, inter-enterprise linkages, and entrepreneurship. It also aimed to improve the quality of life of SME employees, a perspective not found in the Japanese recommendations.

5.6.4 The Factory Evaluation System

The enterprise evaluation system (*shindan*) is one of the measures that contributed greatly to SME development in post-war Japan. In the Japanese system, persons with sufficient knowledge and skills for diagnosing and advising enterprises are certified and registered by the state as '*shindan-shi*.' Japan also has institutions to train, test, and re-train them. *Shindan-shi* conduct comprehensive analyses of enterprise performance from managerial and financial perspectives, identify challenges and opportunities for growth and provide general hints for addressing the challenges and seizing the opportunities. Their broad instructions can be combined with the assistance of more specialized business service providers. *Shindan-shi* evaluation and guidance also greatly facilitate SMEs' access to bank finance. A *shindan-shi* as a general practitioner is often likened to a home doctor rather than a specialized surgeon.

In Thailand, the factory evaluation system was one of the 24 projects included in the 1999 IRP implementation plan. MOI set up the Committee for Promoting the

SME Evaluation Program inviting members from public organizations and private stakeholders. The BSID under DIP of MOI was made responsible for the program. The actual implementation was delegated to TPA, an NPO mentioned above. Japan also provided intensive support. A Japanese advisor, the Mizutani Plan, and the JICA's follow-up survey offered information on the objective and institutional design of this system, criteria for selecting eligible SMEs, program content, and so on. The training of evaluators and the trial implementation of factory evaluation were conducted in four phases from July 1999 to March 2002 during which 115 Japanese experts were mobilized, 479 associate *shindan-shi* were trained, and close to one thousand factory evaluations were made. Beneficiary SMEs were generally satisfied with the evaluation work conducted on them.

However, there was a problem with the implementation mechanism on the Thai side. The project office at TPA was staffed by Japanese experts with few Thai participants. The responsible BSID official was too busy to pay enough attention to the daily operation of the program. The Japanese experts were frustrated with the frequent changes of Thai counterparts at TPA. Moreover, the Japanese experts had to lead the design as the *shindan* system was new to Thailand. Learning by Thai consultants and the local adjustment of the Japanese model did not progress as planned [39].

After the economic crisis subsided and Japanese intensive support ended, the factory evaluation system evolved in a way considerably different from Japanese expectations. The authority to establish the system was transferred from MOI to OSMEP but the latter attached low priority to this project. There was also some reservation within the Thai government to legislate a system that could lead to the monopolization of enterprise evaluation services by certified individual consultants. Coordination became necessary between this system and other business consulting services. For these reasons, the Thai *shindan* system turned out to be informal without state guidance, criteria, or certification. From the Japanese viewpoint, such an informal system failed to ensure the quality of the consulting services [18].

Meanwhile, MOI continued to use trained associate *shindan-shi* for its policy implementation even after Japan's intensive support ended. Their diagnosis was required before firms applied for such MOI projects as 'Invigorating Thai Business Targeting Rural SMEs.' MOI also trained evaluators at the regional level using programs with a shorter training duration than the Japanese. Responding to the political trend that emphasized rural industries and the above-stated need to coordinate various consulting services, MOI began to strengthen the supporting institutions for regional SMEs. With continued support from JICA, MOI established the Regional Integrated SME Promotion (RISMEP) system nationwide by linking various BDS providers to offer collective support to SMEs in each region. As the policy focus shifted from urban industries to rural SMEs, responsible sections within MOI also changed from BSID to the section in charge of industrial and enterprise development in general.

The Thai *shindan* system thus has become more informal with a rural focus, but some of the original traits remain. Just as Japanese *shindan-shi* act as general practitioners attending to the diverse needs of SMEs and referring them to appropriate specialists, Thai consultants in the RISMEP network collectively help SMEs

by bringing diverse expertise. Another surprising development was that TPA that initially trained *shindan-shi* for MOI and TNI, the private university created by TPA, continued *shindan* consultation and *shindan-shi* education in their programs and curricula [29]. A few other universities also offered *shindan-shi* training. The evolution of the Thai *shindan* system, though unforeseen by the Japanese, may have made itself more suited to Thai reality.

5.6.5 The Automotive Supporting Industries

Supporting industries (*susono sangyō* in Japanese) refer to producers located in the country—regardless of the nationality of the firm—that supply materials and components with high quality, low cost, and on-time delivery (the QCD requirement) to final assembly firms operating in the same country. Their existence broadens the industrial base, reduces reliance on imported inputs, increases domestic value creation, and boosts the competitiveness of assemblers which are often FDI firms. As Thailand began to attract many foreign assemblers of automobiles, consumer electronics, machinery, etc., especially from Japan, the thinness of the Thai supporting industries was identified as a barrier to the further growth of both Thailand and FDI firms. The economic crisis of 1997–1998 highlighted the necessity of developing the supporting industries for the survival and future prosperity of mechanical industries in Thailand.

The Thai government created two sectoral Institutes for the automobile and electronics industries (TAI and EEI) in 1998. Beyond that, however, the 1999 IRP implementation plan did not propose any concrete projects for supporting industry promotion. By contrast, the Japanese businesses became more serious about developing supporting industries partly for the benefit of Thailand but mostly for their survival. In 1998, Japan announced a plan to assist the automotive supporting industries in four ASEAN countries including Thailand. In 1999, the Mizutani Plan proposed a comprehensive on-site technical guidance program for supporting industries. Local enterprises with future potential were to receive on-site technology transfer from experienced international experts. The assumption was that on-site technical guidance was more effective than off-site seminars and classroom training.

This cooperation started with the Automotive Expert Dispatching Program from October 2000 to September 2005 in two phases. Experts from Japanese automotive firms, in collaboration with TAI, provided technical support to about two hundred local automotive parts manufacturers. Initial hitches over the selection of target companies and the limited number of Thai consultants to accompany Japanese experts were solved over time. The program was highly evaluated for concreteness and relevance by both Thai component manufacturers and their business partners, especially the Japanese automotive assemblers [24].

The Thai automotive sector not only survived the economic crisis but began to expand strongly. Prime Minister Thaksin set the goal of Thailand becoming the 'Detroit of Asia.' The inflow of Japanese automotive FDI accelerated after 2002 with the expectation of Thailand becoming the hub of the automotive industry in

Southeast Asia. Thai automotive production not only recovered but exceeded the 1 million-unit mark in 2005, ahead of the plan target.

The Automotive Expert Dispatching Program was succeeded in 2005 by a scaled-up and broader initiative of the Automotive Human Resource Development Project featuring the experts from Toyota, Honda, Nissan, and Denso to train Thai trainers in their respective assigned fields: Toyota Production System, skills certification, mold and die technology, and mindset and manufacturing skills, with TAI serving as the secretariat [25]. Separately, TAI continued to train automotive engineers and technicians through 26 open courses and 68 in-house courses, combining Japanese management methods it has learned and other topics. Although the on-site guidance program initiated by Japan in the aftermath of the economic crisis was not institutionalized as originally envisaged, TAI has incorporated its lessons in their daily work in the promotion of the Thai automotive sector.

5.6.6 Lessons

The three specific projects of Japanese industrial cooperation discussed above identify four factors that contributed greatly to the effective execution of crisis response actions. They are the seriousness of both private and public stakeholders to collaborate and cope with the crisis, a strong commitment at the highest level (prime minister), the mobilization of competent Japanese experts in large numbers and from many relevant organizations, and the collection of real-economy sector-specific information insisted by the Japanese team which was needed to adjust the Japanese model to Thai reality. In addition, three conditions that existed even before the crisis also had favorable influences. They were the awareness of the structural vulnerability of Thai industries among Thai leaders and officials, the long-term multi-faceted bilateral relationship based on trust, and the presence of a large number of Japanese enterprises operating in Thailand. The last generated an expectation among Japanese FDI firms of strong policy cooperation by the Japanese government as well as their willingness to contribute to crisis management, especially in the automotive sector.

It must be admitted that, in the cooperation projects examined here, the proper balance between Japanese leadership and Thai ownership took some time to emerge. In all cases, donor-driven aspects were visible at the outset which were however reduced over time as the Thai side gradually regained commitment and ownership. This may have been inevitable because speed was imperative in crisis response and there was little time to forge mutual understanding and agreement on project details. Thailand learned the Japanese models, modified them to local conditions, and fashioned new models. This was so in the creation of the SME Master Plan, the factory evaluation system, and the automotive training mechanism. Due to the short project duration, the level of Thai participation in the fieldwork was mixed and sometimes very low but this did not prevent Thai learning in the long run. In the end, institutional development took many unexpected turns for Japanese officials and experts.

For proper translative adaptation, ownership and effort must be exerted by local hands, not by well-meaning foreign experts.

5.7 Conclusion

This chapter offered the four case studies of Japanese policy dialogue accompanied by concrete industrial cooperation projects. They revealed the unvarying philosophy of Japanese development cooperation such as country customization, real-sector orientation, and the creation of a wise state rather than a small one. At the same time, each case was unique and different because countries wishing to learn from Japan faced different challenges and circumstances, and policy dialogue had to respond to this diversity. This chapter has also made clear that successful policy dialogue requires certain basic conditions. They include request and commitment at the highest level, ultimate country ownership, mutual respect and trust, concrete actions and cooperation projects to realize proposed ideas, local adjustment to the imported model, and the deep knowledge of the host country, benchmark countries, and the industry in question as the background information for effective local adjustment. These are also the conditions necessary for translative adaptation, a concept emphasized in our study.

The fundamental complexity of policy dialogue comes from the dynamic interaction of two distinct socio-economic cultures which often generates conflicts and unexpected turns and results. To cope with this complexity, comparative perspective and relativism are indispensable instead of absolute advice presented as 'international best practice' and 'foreign experts know better.' The comparative perspective is needed across countries, across time, and across regions, sectors, and firms within one country. In any comparison, both common and unique features are present. The important thing is not just to know this general truth but to identify exactly what is common and what is unique in constructing a model most fitting to one's society. This calls for an enormous amount of knowledge, experience, and trial and error. This is why policy dialogue requires much research, patience, flexibility, discovery, and innovation on both sides. The two attitudes that surely fail are the refusal to learn from others because 'our country is unique, and nothing can be learned from others' and a copy-and-paste strategy without scrutinizing the local and foreign contexts. Policy dialogue demands far more knowledge and thinking than either.

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Chapter 6
Industry Engagement in TVET and the Japanese Cooperation in Vietnam: The Case of Hanoi University of Industry

Junichi Mori

6.1 Introduction

Strengthening industry engagement is a common challenge for the governments and technical and vocational education and training (TVET) institutions in developing countries across Asia and Africa [3, 6, 28]. In order to involve industry more in TVET, many developing countries are attempting to adopt measures to develop an employer-led skill formation system, which is created primarily in developed countries and promoted as international best practice by those countries. They comprise the competency-based training (CBT) system and Sector Skills Councils (SSCs) [11, 16, 24].

However, many developing countries, including Vietnam, still struggle to effectively engage industry in TVET [3, 6]. Some TVET institutions have invited selected firms to curriculum improvement meetings to obtain more information about their skill needs, following curriculum development methods commonly utilized in the CBT system [4]. Nonetheless, their attempts often fail to deliver tangible results [28]. This may of course mean that they need to improve their approach to engaging firms, but there are more fundamental issues with directly applying the standard measures of the employer-led skill formation system to developing countries.

First, the standard measures of the employer-led skill formation system often focus on the general improvement of regulatory framework and business environments.

The views expressed here are those of the author and do not necessarily reflect the views of the International Labour Organization (ILO).

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But, in order to make the system work and deliver the required results, it is also necessary to develop the capacity of respective TVET institutions to enhance industry engagement. Therefore, the approach to improving the 'framework' of the TVET system needs to be complemented by an approach to enhancing 'ingredients,' such as key institutions of the system [35, 46, see also Chap. 1].

Second, it is hard for developing countries to achieve the level of international best practices, which were usually formed in developed countries, in a single step. They have to find a step-by-step path toward this goal, implementing solutions according to their particular stage of development [19]. Finally, international best practices do not necessarily work in all countries [39] since skill formation models can differ according to each country's historical and institutional background [5, 7]. Although other countries' practices can be a useful reference for policy learning, eventually each country needs to design an industry engagement system that is workable within its own economic, social, and institutional contexts.

In other words, developing countries need to give due attention to the process of local learning and to the 'translative adaptation' of international best practices [25, p. 175, 36, p. 12], rather than simply borrow them from developed countries [9]. However, there is little research addressing how developing countries can develop their capacities and adapt foreign systems for industry engagement in TVET to their country-specific contexts. Therefore, this chapter aims to examine the process of developing a system for industry engagement in TVET through learning foreign countries' models by studying the case of the Hanoi University of Industry (HaUI) in Vietnam. The research has found that HaUI has adopted a Japanese approach with technical guidance from the Japan International Cooperation Agency (JICA) after studying various countries' models. Furthermore, HaUI continues to adapt the Japanese model to their economic and institutional contexts. This chapter analyzes HaUI's learning processes, introduces how Japanese development cooperation assisted these processes, and highlights challenges facing HaUI. This examination is based on the analysis of 25 qualitative interviews conducted in December 2019 with three key sets of actors: five HaUI staff, 17 employers, and three policymakers.

6.2 Overview of Industry Engagement with TVET in Vietnam

6.2.1 Government Policies

In Vietnam, employers are often passive participants with limited engagement in skills formation [43]. As a result, the Vietnamese government has started paying closer attention to the importance of industry engagement in TVET [10, 34], in accordance with the recommendations of various international organizations [1, 23, 44]. The government is following the standard policy measures of the employer-led

skill formation system, or a 'vocational education and training tool kit' [26]. For one thing, the government has adopted the CBT model, which aims to ensure that TVET programs deliver the skills required by industry through curriculum development and skills evaluation with inputs from employers [6]. Accordingly, the government continues to develop the National Qualification Framework (NQF), along with competency-based standards, which are important elements in the realization of CBT [12, 42].[1] Furthermore, the government is promoting training and recruitment contracts between firms and TVET institutions, aiming to implement TVET programs that correspond to employer requirements [2, 14, 40]. In doing so, apparently policymakers were inspired by the apprenticeship contracts promoted in some developed countries, as well as the German Dual Training system [28].

6.2.2 Challenges for Industry Engagement

Despite various policies aiming to promote industry engagement, policymakers and educators struggle to involve firms in improving education and training programs. Most cooperation activities between TVET institutions and firms tend to be limited to recruitment and unsystematic employment-related activities such as job fairs and internships, in which students are sometimes treated as seasonal workers rather than trainees [27, 28, 44].

This means that industry engagement in TVET is still in its initial stages in Vietnam. According to JICA [20], the partnerships between TVET institutions and firms require the following six steps for development: (i) recruitment activities, such as job vacancy advertisements and job fairs; (ii) employment support activities, such as company visits by students and special lectures by graduates working in firms; (iii) student capacity development, such as internships, lectures by company experts, and production of simple equipment based on orders from firms; (iv) TVET institution capacity development, such as training for teaching staff by company experts and curriculum development with input from firms; (v) company employee capacity development, such as short-term training courses organized by TVET institutions; and (vi) joint research (see Fig. 6.1). In general, firms proceed to the later steps of partnerships only when they become more confident in the capacity and reliability of TVET institutions, including the management of patent information related to new technologies and the quality of their students. In Vietnam, most TVET institutions are at Step 1 or 2.

Some policymakers and educators attribute this situation to industry's reluctance to participate in TVET reform and claim that employers are not taking adequate responsibility for upskilling [28]. However, this is mainly because skill demand is not growing as dynamically as the government and some international organizations

[1] According to World Bank [45], a final NQF proposal is expected to be completed by the end of 2014. However, as of August 2022, the author could not find publicly available evidence that it was completed.

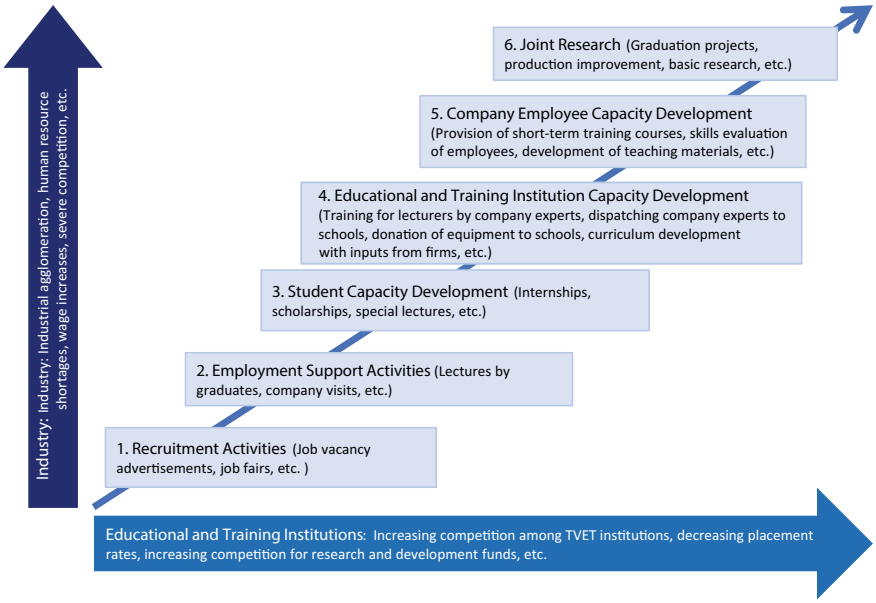

Fig. 6.1 Basic steps of partnership development between educational establishments and industry (*Source* Mori [28, p. 228])

presume. For example, many firms in the machine manufacturing industry do not require a large skilled workforce because they are not necessarily trying to climb up value chains or adopt new technologies [29]. When skill demand is weak, few employers see the benefit in proactively engaging with education reform. This makes it difficult for TVET institutions to develop enduring partnerships with such firms.

6.3 JICA Support to Hanoi University of Industry

After learning various countries' models for industry engagement in TVET, mainly through the official development assistance (ODA) project, HaUI introduced the Japanese model for industry engagement with technical assistance from JICA. This section explains what prompted HaUI to introduce the Japanese model and how JICA assisted HaUI in strengthening partnerships with industry. This case may provide one way for TVET institutions to enhance industry engagement by overcoming challenges described in the previous section.

6.3.1 Background for the HaUI-JICA Project

In order to promote industry engagement in TVET reform, the Vietnamese government has been receiving assistance from multilateral donors, as well as bilateral donors such as Germany and Japan, through ODA projects [13, 17]. As a part of these development cooperation activities, JICA implemented the Project for Human Resource Development of Technicians at the Hanoi University of Industry (hereafter called the HaUI-JICA Project) from January 2010 to January 2013.

The HaUI-JICA Project started five years after the completion of the preceding project, the Project for Strengthening Training Capabilities of Technical Workers at Hanoi Industrial College (hereafter called the HIC-JICA Project), which was implemented from 2000 to 2005. The HIC-JICA Project aimed to upgrade the technological knowledge and skills of prospective technicians in the fields of machinery processing, electric control, and sheet-metal processing. This project provided not only technical guidance from Japanese experts but also training equipment [30]. Immediately following the project's completion, the Hanoi Industrial College (HIC) added university courses to its offerings, resulting in a status upgrade. In December 2005, it was renamed Hanoi University of Industry (HaUI).

Building on the above achievement, the HaUI-JICA Project attempted to further develop HaUI's capacity to supply high-skilled workers who meet industry skills needs in the manufacturing sector. The project focused on the delivery of three outputs: (i) the enhanced management cycle to improve HaUI's education and training programs based on needs of industry; (ii) the development of pilot skill tests; and (iii) the improvement of an employment support system [32].

In order to enhance industry engagement in TVET and based on the Japanese experience of TVET reform in the 2000s [38], the HaUI-JICA Project introduced a training process management system, the Plan-Do-Check-Act (PDCA) cycle of training program development and implementation. The training process management system consists of seven main steps: (i) determination of industry skills demand; (ii) selection of the training fields; (iii) development of curricula; (iv) preparation for training program delivery; (v) implementation of training programs; (vi) evaluation of training programs; and (vii) formulation and implementation of action plans. The HaUI-JICA Project focused on the above steps one through three and six through seven, given that the HIC-JICA Project covered the processes four and five.

Constant engagement of employers is at the core of the training process management system. Support provided by the HIC-JICA Project enabled HaUI to develop relationships with some firms, which resulted in the offering of internships and production of simple equipment based on manufacturing orders in order to improve the practical skills of students [30]. However, HaUI did not have a solid method to identify industry needs for curriculum improvement. Therefore, it was necessary for HaUI to strengthen its system to determine industry skills needs and continue improving its training programs in close cooperation with industry.

6.3.2 *Enhancement of Industry Engagement in Improvement of Education and Training*

Based on the above situation, the HaUI-JICA Project first encouraged lecturers to visit enterprises, rather than waiting for employers to come to HaUI. In 2010, the project organized an industry needs survey to grasp industry's perception of HaUI's training and educational program graduates [31]. Importantly, HaUI lecturers and staff carried out the survey by themselves and did not outsource it to professional research companies. This is because the lecturers and staff can gain more information through face-to-face interviews than by simply reading a survey report, which cannot cover all relevant issues. Throughout this industry needs survey, HaUI members visited 233 enterprises in total during the project implementation period. Among 15 key working group members, the average number of company visits was 32.4 during the project implementation period, while the most active member visited 124 companies [32]. This also indicates that there was variance among working group members in terms of motivation and ability to make appointments with firms.

Through company visits, HaUI staff gradually understood what types of companies are likely to be interested in cooperating with HaUI. Employers tend to approach different types of education and training institutions, depending on their stage of development and occupational demand. For example, manufacturing companies usually try to recruit core professional staff, such as managers, administrative staff, and engineers at the setting-up stage. As they stabilize the operation and increase production, their attention shifts to intermediate workers, such as technicians and skilled operators. TVET institutions have a higher chance of developing partnerships with industry in this stage. In particular, suppliers which produce some components pay higher attention to intermediate workers than assemblers [29]. In short, it is not necessary that HaUI staff receive positive responses from all firms they visited. Understanding this simple fact allowed HaUI staff to accept the inevitability of trial and error and gradually increased their confidence to deal with firms (Fig. 6.2).

While encouraging HaUI staff and lecturers to go to enterprises, the project asked enterprises to come to visit HaUI [32]. Lecturers can learn a lot from on-site advice by enterprise experts. Furthermore, this provides a great opportunity to develop mutual understanding between HaUI and firms. To promote employers' visits to HaUI, the project implemented several measures. First, it developed the partnerships with intermediary organizations, in particular industrial zone management companies. Second, the project assisted HaUI to organize events through which company representatives can visit the campus. For example, with technical guidance from JICA experts, HaUI organized four '5S Weeks' during the project implementation period, events meant to increase awareness of the 5S among all lecturers, staff, and students.[2] For the first 5S Week in April 2012, the project, with support from two large industrial zone

[2] The 5S approach consists of: (i) sorting; (ii) setting in order; (iii) shining; (iv) standardizing; and (v) sustaining [21]. It is widely recognized by enterprises as a useful means to improve productivity and work environments. See JICA [20] and Mori [27] for further details of the activities conducted at HaUI.

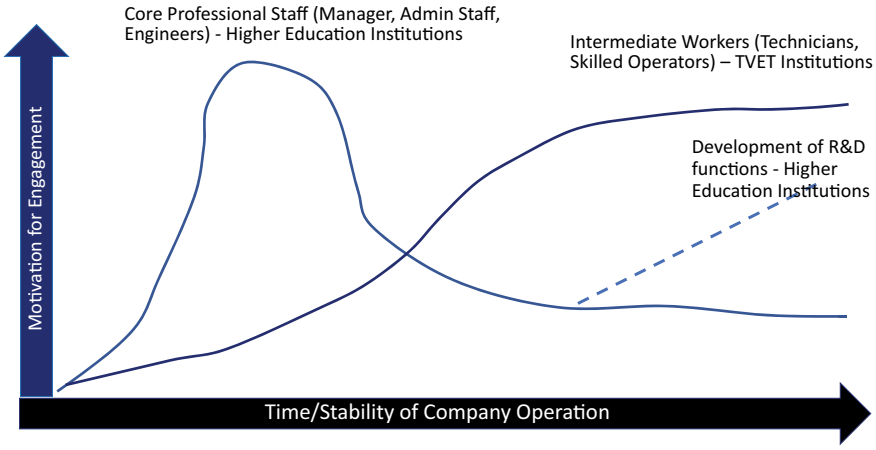

Fig. 6.2 Transition of firms' motivation to engage education and training institutions (*Source* Elaborated by the author)

management companies in Hanoi and Hai Phong [32], attracted 28 firms. Some firms that participated in this event sent their staff for short-term training courses organized by HaUI in the later stage of the project. Finally, the project assisted HaUI in organizing campus tours more strategically. HaUI improved their displays by highlighting their vision, the characteristics of their training programs, and key achievements. In addition, they showed the results of their 5S activities, which were very useful to convince employers of the quality of HaUI's training programs.

During the project implementation period, 175 enterprises visited HaUI. On the other hand, as described in Fig. 6.3, the number of company visits from HaUI staff gradually decreased in the second and third years. HaUI did not need to visit companies all the time, as more companies started visiting them. This indicates that a two-way relationship between HaUI and industry has gradually developed.

Based on the relationships developed through company visits and other activities, HaUI went through the full cycle of training process management, developing and implementing short-term courses based on employer skill needs. With technical guidance from JICA experts, HaUI designed and implemented new short-term courses on machinery maintenance in 2012. The project's working group members developed the course outlines and training materials during a series of discussions with the focused company group. In meetings with companies, one principle was applied: HaUI had to present their proposal first rather than waiting for industry's proposal. For example, even at the very first meeting, HaUI brought the outline of training programs based on a sample textbook provided by JICA experts. This is because in the reality, there are not many firms that can articulate their skills needs [28]. The four machinery maintenance courses attracted 76 participants from 17 enterprises [20]. The number of applicants was far more than expected. Therefore, HaUI needed to increase the number of courses from two to four. Furthermore, some companies

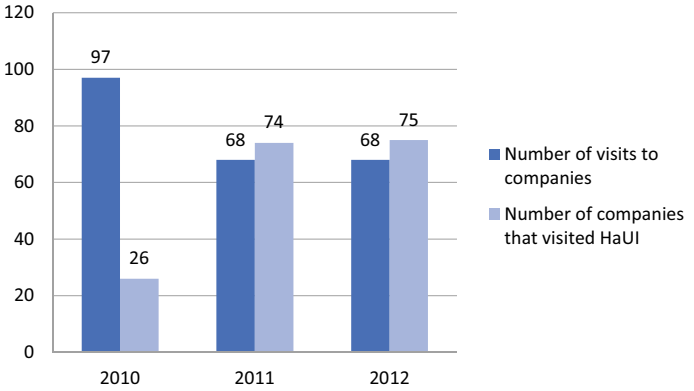

Fig. 6.3 Visit to and from companies in 2010–2012 (*Source* JICA [20, p. 19])

started asking HaUI to develop tailor-made courses for them, seeing the results of the machinery maintenance courses. HaUI provided tailor-made courses on machinery maintenance and machining for three Japanese firms in 2012. This gave HaUI confidence that industry will join their training programs if they properly respond to their skills needs.

The improvement in cooperation with firms also led to the development of a comprehensive employment support system, which also increased opportunities to interact with industry and provided HaUI with an alternative route to collect industry skills needs information. It comprises several activities including: (i) internship programs; (ii) company study tours; (iii) lectures by graduates; (iv) job fairs; (v) collection and circulation of job opportunity information; and (vi) career counseling [18]. In order to operationalize the employment support system, HaUI established the Employment Support Committee in May 2011, which consists of members from relevant faculties, centers, and departments.

The HaUI-JICA Project also assisted HaUI in developing an institutional mechanism for industry engagement in TVET, based on the tangible results of enhanced industry engagement activities. The first step was the promotion of information sharing on inquiries from industry across faculties and centers. At weekly project working group meetings, the project presented the list of inquiries from companies and encouraged working group members to respond to them together. HaUI obtained and dealt with 222 inquiries from enterprises in the project implementation period (see Table 6.1).

In order to maintain project activities and further strengthen industry partnerships, HaUI established an Industry Partnership Board under the Training Department in 2012. HaUI nominated members of this Board from all faculties, centers, and relevant departments, while establishing the office as the secretariat of the Board. The main functions of the Board were to: (i) receive inquiries from enterprises and send them to relevant faculties and centers under HaUI; (ii) follow up on the progress of inquiries and prioritize potential partnerships in cooperation with relevant faculties and centers;

Table 6.1 Inquiries from firms by category (2010–2012)

Category	2010	2011	2012	Total	%
Company Tour	5	7	3	15	6.8
Demonstration	1	0	0	1	0.5
Donation of Equipment	2	1	4	7	3.2
Internship	28	16	7	51	23.0
Job Fair	0	1	1	2	0.9
Joint Research	0	0	1	1	0.5
Joint Seminar	0	2	2	4	1.8
Language Course	2	0	0	2	0.9
Lecture by Graduate	5	1	1	7	3.2
Manufacturing Order	1	2	2	5	2.3
Recruitment	44	15	24	83	37.4
Scholarship	1	2	1	4	1.8
Skill Competition	0	0	0	0	0.0
Skill Test	2	0	2	4	1.8
Short-term Course	11	7	8	26	11.7
Text Book	2	3	1	6	2.7
Others	1	2	1	4	1.8
Total	105	59	58	222	100.0

Source Mori et al. [32]

and (iii) lead the improvement of various procedures and schemes related to industry partnerships. In short, the Board was supposed to take over the role of HaUI-JICA Project's office for facilitating partnerships with industry.

After the completion of the HaUI-JICA Project, HaUI established the Center for Enterprise Partnership (CPA) in 2014, which took over the functions of the Industry Partnership Board and the Employment Support Committee.[3] It also planned and organized the national skill assessment, the second output of the project. HaUI top management appointed the director and staff of CPA from the project working group members, each of whom went through on-the-job training provided by JICA experts. In addition, they recruited one of the project staff, who was a HaUI graduate, as a full-time staff of the center. Her role was to virtually transfer all project information to the CPA, including tacit knowledge on methodologies to develop partnerships with industry. Moreover, the CPA played an important coordination role in the subsequent JICA project, the Project for Strengthening Training of Trainers (ToT) Functions at Hanoi University of Industry (hereafter called the HaUI-JICA Phase III Project),

[3] HaUI set up the Center for Enterprise Partnership and Vocational Skill Assessment on 14 February, 2014 and renamed it as the Center for Enterprise Partnership on 14 March, 2017 [8].

launched in June 2013. This project aimed to transfer HaUI's knowledge and experience acquired through the previous two projects to other TVET institutions, focusing on the fields of machining, electric control, and electronics [41].

6.3.3 HaUI's Motivation to Learn a Japanese Model

HaUI has learned Western, Japanese, and other Asian countries' TVET systems by taking advantage of ODA projects. In relation to industry engagement for training program improvement, the first foreign model that HaUI learned was the Developing a Curriculum (DACUM) method, which originated in Canada and was brought to Vietnam through a German development cooperation project with the General Department of Vocational Training (GDVT).[4] The core of DACUM is to identify employer skill needs through elaborate job and task analysis [12]. This is a well-structured but also rigid process in the sense that TVET institutions need to invite company experts to carry out this analysis. Another curriculum development and industry engagement model that HaUI studied was the Japanese training process management system (see Sect. 6.3.1). While this model also requires input from employers, the method of obtaining their feedback is not as rigid as that of DACUM. If it is difficult to invite employers for job and task analysis, TVET institutions can also obtain information by visiting firms and asking questions from various angles, such as those about the structure and content of internal training programs.

Comparing the foreign models described above, HaUI top management staff found some common elements in the approaches they learned, including DACUM, CDIO (Conceive, Design, Implement, Operate), and the Japanese training process management or PDCA model. However, they considered that the PDCA model is the easiest to understand and implement and the most applicable in the context of Vietnam. HaUI therefore selected the Japanese training process management system for its TVET programs at their own initiative.[5]

It is presumed that HaUI appreciated the programmatic or flexible aspect of the Japanese training process management system, which aims to improve curricula based on skills needs information collected in various ways. This is because it is not easy to gather a sufficient number of company experts for curriculum development meetings in Vietnam, where skill demand lacks dynamism and is weak in some industries. HaUI staff have perceived that few firms are interested in supporting them to improve training programs by providing them with comments on curricula or sending technical experts to meetings. In particular, small and medium enterprises, especially Vietnamese ones, are not very keen to cooperate with HaUI or other TVET institutions, while a few foreign-invested enterprises (FIEs) are eager to assist

[4] The GDVT was renamed as the Directorate of Vocational Education and Training (DVET) in 2017 [15].

[5] Based on the author's interview with HaUI staff, including a board member and a head of department, which was conducted in December 2019 (see Sect. 6.1).

them. In fact, most interviewed employers stated that they had never participated in curriculum improvement meetings.

Another reason to select the Japanese training process management system is the structured learning process applied in transferring this model. HaUI staff valued the hands-on support from JICA experts, including the provision of a concrete roadmap, specific instructions, and capacity development opportunities. They explained that Japanese experts provide more detailed technical guidance in the hands-on approach [35], while European experts present their models and act as facilitators rather than getting involved in the details of an implementation process.[6]

HaUI regards the Japanese training process management model as the most feasible option, but this does not mean they will solely depend on it in the long term. They are also attempting to continue learning Western countries' methods related to education and training program development. For example, they are utilizing the CDIO for the curriculum development for their university courses. In short, HaUI is open to various learning models and keeps searching for a method or model suitable for their capacity or situation, each of which could dynamically change. This indicates their strong sense of ownership in learning foreign models, realizing that the choice lies with them.

6.3.4 Confidence with the Accumulation of Small Successes

It is likely that small successes of daily operations, starting from the acceptance of meeting appointments and positive feedback on internships or short-term training courses, gave HaUI staff confidence to deal with more firms. In the process of creating a chain of small successes, HaUI has been simultaneously developing the capacity required for engagement. Interviewed HaUI staff stated that they were able to achieve these small successes, taking advantage of the hands-on development cooperation provided by JICA, which basically supports 'learning by doing.' At the same time, they have developed the capacity to not only develop good relationships with firms but also carry out continuous and mutual learning by themselves.

In Vietnam, many firms feel reluctant to communicate with lecturers and staff of TVET institutions, not because of their insufficient technical knowledge but because of their unprofessional behavior, represented by appointment requests made at very short notice and inappropriate outfits worn by lecturers and students [20]. In the past, HaUI was trapped in a vicious cycle in which a lack of organizational strategies, motivation, knowledge of firms, and appropriate behaviors caused negative feedback from employers, making staff more hesitant to approach firms [20, p. 18]. However, the interview results indicate that they are now becoming more confident to engage with employers. This means that they have successfully shifted into a virtuous cycle

[6] Based on the author's interview with a head of HaUI's one department, conducted in December 2019.

of partnership development, where positive responses from firms further encourage staff to approach them for partnership building.

Furthermore, the accumulation of these small successes let top management to approve the substantial investment of personnel necessary to establish the CPA as a designated unit for industry engagement. In other words, HaUI needed to accumulate a few small successful cases before setting up an institutional mechanism. In fact, many TVET institutions designate a unit to encourage partnerships with enterprises, but they struggle to develop partnerships [28]. This means that setting up an institutional mechanism, or 'framework,' does not work in isolation. Partnerships require 'ingredients,' including people who have the knowledge and confidence to approach and partner with firms.

6.4 Progress of HaUI's Industry Engagement After the HaUI-JICA Project

HaUI's activities and its institutional mechanism for industry engagement have been gradually changing since the completion of the HaUI-JICA Project in 2013. This section explores how HaUI has continued to enhance its industry engagement system, focusing on: (i) the ways to learn industry skills needs; and (ii) its institutional mechanism for industry engagement.

6.4.1 Changes After the HaUI-JICA Project

HaUI has maintained or enhanced some of its industry engagement activities after the completion of the HaUI-JICA Project. For example, HaUI succeeded in attracting more than 100 firms to their job fairs in 2019 and about 1,000 students acquired jobs after the event (Steps 1 and 2 of Fig. 6.1). This also suggests that they have improved their methods for approaching and following up with firms. In addition, HaUI has been attempting to improve the quality of its internship program (Step 3 of Fig. 6.1) by establishing guidelines for the responsibilities of lecturers and employers during internship periods. Finally, HaUI has become more aware of promoting mutual benefits of partnerships with firms. For example, HaUI is helping firms that donate tools and equipment to them to do marketing in their network with other industry partners.[7] In fact, this practice was introduced through the HaUI-JICA Project [32]. HaUI has adapted and continued what they have learned.

Despite the above successes, HaUI faces some challenges in keeping or advancing partnerships with firms. First, it still has difficulty conducting joint research with firms, which would be the final step of industry engagement (Step 6 of Fig. 6.1). Second, some activities related to the capacity development of HaUI (Step 4 of

[7] Based on the author's interview with a CPA staff, conducted in December 2019.

Table 6.2 Status of employer engagement activities at HaUI

Step*	No.	Item	Status
1	1	Recruitment Coordination	Maintained
2	2	Job Fair	Scaling-up
	3	Company Study Tour	Maintained
	4	Employment Situation Suvey	Maintained
3	5	Internship	Maintained
	6	Sending Univ. Students to Japan	New
4	7	In-Company Training for Lecturers	Discontinued
	8	Company Visit	Declining
	9	Curriculum Improvement	No significant results
5	10	Short-Term Training Courses for Company Employees	Scaling-up
	11	National Skills Tests	Scaling-up
6	12	Joint Research	Not much progress

Source Elaborated by the author
* Refer to the steps of partnership described in Fig. 6.1

Fig. 6.1) piloted during the HaUI-JICA Project have been conducted less often than they were during the project implementation period (see Table 6.2). In addition, HaUI did not organize in-company training programs for their lecturers. It is presumed that HaUI has difficulty in negotiating with firms to receive the lecturers for in-company training without support from foreign experts. This may be also in part because some lecturers lack willingness to learn firms' training methods.

6.4.2 *Learning Industry Skills Needs Through Partnership Activities*

HaUI has been customizing and internalizing the way they collect skill needs information, taking into account their capacities and other constraints. During the HaUI-JICA Project, HaUI members visited many firms as reported in Sect. 6.3, but it appears that this activity has not been continued in a structured way based on a shared organizational strategy for industry engagement. This could be because some teachers are reluctant to visit firms due to time constraints or because there is not enough transport budget allocated, as already indicated during the HaUI-JICA Project [32]. HaUI added the cooperation with enterprises to the job description of lecturers toward the end of the HaUI-JICA Project.[8] However, the interview data indicate that while some lecturers are actively engaged with firms, others are not. This is because they do not

[8] According to the author's interview with one HaUI staff conducted in December 2019, their lecturers need to spend 50 percent of their working time on industry engagement. However, this seems too large.

Table 6.3 HaUI's short-term training courses (by type of client)

Organization	2012	2013	2014	2015	2016	2017	2018	2019	Total
Japanese Firms	6	9	11	14	16	11	12	5	84
Other FIEs	0	0	0	0	0	16	13	1	30
Vietnamese Firms	0	0	0	2	0	22	5	7	36
Educational Establishments	0	0	1	3	2	4	1	0	11
Government Agencies	0	0	0	0	0	2	7	0	9
Total	6	9	12	19	18	55	38	13	170

Source Elaborated by the author based on the data provided by HaUI

have sufficient skills or knowledge to contact and negotiate with firms or they are busy with teaching.

Therefore, instead of industry needs surveys, some HaUI staff are trying to collect skill needs information through partnership activities with firms, such as internships or networking with alumni. In addition, HaUI apparently does not continue to visit as many companies as it did during the HaUI-JICA Project, although many companies appear to keep visiting HaUI instead. They consider it more effective to directly collect industry skills needs information and update curricula periodically than to organize job and task analysis workshops, which they have difficulty convincing experts from companies to join. HaUI staff consider it the most feasible and realistic solution in light of their capacity and the weak motivation of employers to participate in improving training programs.

The formulation and implementation of short-term training courses for firms also provide HaUI with a great opportunity to learn industry skills needs, including up-to-date technologies and challenges. HaUI has been providing an increasing number of short-term training courses customized for client firms and other organizations (Step 5 of Fig. 6.1). In addition to existing partners, HaUI has found new clients, such as non-Japanese FIEs (see Table 6.3). HaUI has been providing some companies with regular training courses every year. For example, it has been organizing a training course on conventional milling and turning for one Japanese firm.

It is important to keep the access to new partners across ownerships and sector. This is because a certain amount of turnover among partnering firms is inevitable. In fact, although HaUI developed partnerships with some companies through JICA projects, its relationships with a few of them have diminished since the project completion. For example, one Japanese plastic injection mold supplier used to receive interns and recruit HaUI graduates since the HIC-JICA Project. However, after the change in Japanese top management, the company recently stopped receiving interns. Another case is a Japanese machinery parts supplier that ordered a tailor-made training on machine tool operation for HaUI during the HaUI-JICA Project. This Japanese parts supplier reported that they have not had much interaction with HaUI recently.[9]

[9] Based on the author's interview with a director of this supplier, conducted in December 2019.

This indicates that industry partnerships may rise and fall due to various factors. For example, TVET institutions have a chance to develop partnerships with companies that have corporate culture or top management policies committed to upskilling beyond their company or that require skilled workers in particular at the establishment phase. However, these may deteriorate when there is a change in top management or company policies. Firms may become less motivated to cooperate with TVET institutions when they have established their internal training systems, downsized employment, or do not require many skilled workers. Therefore, HaUI has to keep looking for new partners rather than excessively relying on good relationships with existing partners.

6.4.3 Institutionalizing Industry Engagement

In order to expand industry engagement activities, HaUI has strengthened the CPA's capacity by assigning 12 full-time staff. This shows the strong commitment of HaUI's top management to partnerships with industry. Since HaUI's leaders have understood and recognized the importance of partnerships with industry, they established the CPA as a focal point by making significant investment in the center in terms of human resources and facilities.

Furthermore, HaUI has been strengthening the coordination mechanism between the CPA and faculties. Even after the establishment of the CPA, faculties continue to directly receive inquiries from some firms. Thus, the top management of HaUI issues internal rules and policies that recognize the CPA as a focal point for industry engagement and require all faculties and centers to cooperate with the CPA. This was a new mechanism after the HaUI-JICA Project. During the project, the project secretariat had to push all faculties to reveal and share information on inquiries from firms. While each faculty's staff still receive the first contact from firms, some of them are now willing to share the information with the CPA. Some HaUI staff clearly recognize the CPA as the focal point for industry engagement and have shared with the CPA a list of companies who approached them.[10] This is not only because the top management required them to do so but also because some faculties have recognized the benefit of sharing the information with the CPA, which consolidates and analyzes the information.

While the Industry Partnership Board and the Employment Support Committee, established during the HaUI-JICA Project, called regular meetings, now the CPA organizes meetings with a designated staff responsible for the industry partnership in each faculty on an as-needed basis. This may be because of constraints to secure time for regular meetings with teaching staff. In Vietnam, teaching staff often receive salaries based on the hours they teach [32, p. 49]. This is different from Japanese TVET institutions, where many teachers work on a full-time basis and consider participation in some committee meetings as part of their duties.

[10] Based on the author's interview with HaUI staff, conducted in December 2019.

Institutional capacity development enables HaUI to conduct industry engagement activities in a more organized and coherent way than would be possible with each faculty and center taking different actions. Some employers provided positive comments about partnerships with HaUI, particularly regarding recruitment activities and internships. Although these employers organize company introduction seminars in some universities, they consider HaUI more committed than other TVET institutions, observing that it secures a large number of participating students.[11] They presume that HaUI staff take seriously the need to conduct public relations (PR) activities for students. The positive evaluation of HaUI by firms gave it more confidence to work with firms, which in turn makes them more proactive. Currently, HaUI is not only collecting information on industry needs but also providing them with more information on their annual training programs and schedule so that firms can find training courses that fit their needs and allocate the budget.

However, HaUI is still in the process of improving the institutional mechanism for industry engagement. For instance, while the CPA is expanding its role internally, it has not yet started playing a significant role in involving industry partners in improving curricula of regular and long-term training courses. This work is mainly led by each faculty at specialized training centers with limited engagement by firms, in particular FIEs.[12] In this sense, HaUI's internal coordination mechanism is still under development. Faculty members will not fully trust the CPA unless it demonstrates its capacity in developing partnerships with firms. Thus, CPA staff keeps improving their capacity through continuous self-learning, utilizing not only the materials and knowledge provided by the HaUI-JICA Project but also each partnership case. CPA staff sometimes review various documents for industry partnership development drafted through the HaUI-JICA Project and share lessons learned from previous cases and on-going assignments.

The above two examples indicate that HaUI initiatives are supported by pragmatism and persistence, including continuous self-learning. Their pragmatism means that in developing countries, implementing solutions identified during the development stage is required, rather than trying to implement unfeasible international best practices [19]. Their persistence with continuous learning implies that their industry engagement system has not yet reached a complete form and is still in a dynamic process of development.

6.5 Challenges in Disseminating the HaUI Model

Although HaUI has become increasingly recognized as a good partner by industry, it has made limited progress in disseminating its industry engagement system, or the HaUI model, to other TVET institutions in Vietnam. During the HaUI-JICA Phase III

[11] Based on the author's interview with a director of a Japanese automotive designing company, conducted in December 2019.

[12] Based on the author's interview with HaUI staff, conducted in December 2019.

Project, HaUI occasionally shared their experience in developing partnerships with industry with other TVET institutions through seminars and other events. However, at this moment, dissemination only occurs when requested.

HaUI has been disseminating other results of the HaUI-JICA Project, such as the national skill tests on basic machining center operation and 5S, which is based on the Japanese production management system (also see JILPT [22], Mori [27]). However, its industry engagement practice has not been systematically disseminated as much as these activities. There are two possible reasons for limited dissemination of HaUI's industry engagement model: the difference in capacity between HaUI and other TVET institutions and a lack of government support.

6.5.1 Difference in Capacity with Other TVET Institutions

One possible explanation for the limited dissemination of HaUI's industry engagement system is the difference in capacity between the current HaUI and other TVET institutions. The capacity here includes not only the ability to coordinate industry engagement but also the technical ability and the hard infrastructure to provide training, utilizing adequate training equipment and facilities in accordance with industry skills needs. For example, one CPA staff pointed out that industry engagement requires communication capacity, which HaUI has developed with technical assistance from three phases of JICA projects. This is also supported by employers who have indicated that they would be more likely to develop relationships with TVET institutions if they provided more frequent feedback about the training programs and results of internships. Furthermore, HaUI has developed physical training infrastructure with substantial assistance from the HIC-JICA Project [30]. However, many other TVET institutions may not have sufficient capacity to develop partnerships with industries and provide technical training in accordance with their needs.

6.5.2 Lack of Government Support

Another constraint on dissemination is a lack of policy support. HaUI has not received substantial support from the government to disseminate the HaUI model, besides being invited to present in ad-hoc workshops or seminars. All interviewed policymakers recognize HaUI's achievement in industry engagement. However, policymakers in charge of skills policies question the applicability of HaUI's industry engagement system because it is a 'university' with more capacity and resources than other TVET institutions.[13] The government agencies responsible for TVET regard

[13] Based on the author's interview with an official of a government agency, conducted in December 2019.

universities as outside their system, following a model not applicable to TVET institutions. It would be true that as a university HaUI has the advantage of attracting better students in Vietnam, where people excessively respect university degrees [28, 33]. Nonetheless, some of their activities, such as the improvement of communication with firms or the quality of internship programs should be applicable to other TVET institutions, too. This means that a more fundamental barrier to dissemination of the HaUI model is a lack of recognition by government agencies responsible for TVET.

Lack of government support may be in part caused by insufficient inter-ministerial coordination, since HaUI belongs to the Ministry of Industry and Trade (MOIT) while the Vietnamese TVET system is managed by the Directorate of Vocational Education and Training (DVET) under the Ministry of Labour, Invalids, and Social Affairs (MOLISA). For example, HaUI's activities have been introduced often in the events organized by their supervisory ministry, the MOIT, but not others. As a result of low recognition and lack of inter-ministerial coordination, HaUI may have little choice but to disseminate its model on its own. Therefore, the dissemination of their model is sporadic, not systematic.

However, a pilot skill test on machining center operation, another output of the HaUI-JICA Project, was well recognized by the DVET under MOLISA and scaled up to the national skill test [20]. The difference between these two cases may be attributed to the timing and extent of government agency involvement in learning and adaptation. The industry engagement system has been developed mainly by HaUI with little government involvement, although they were always kept updated through project steering committee meetings. In contrast, government agencies, such as DVET, are more involved in the process of developing the national skill test, in part because DVET's approval is mandatory to conduct such a test. Therefore, even in case that a development cooperation project targets the capacity building of an individual TVET institution, the involvement of the government at an early stage contributes to wider dissemination. It would be too late to approach the government when the model has already been adopted or developed. Simply, they would consider it another organization's model. In this sense, the strong ownership and capacity of HaUI to manage everything by themselves may have negatively affected the wider dissemination of their achievements through the government agencies responsible for TVET since they did not need significant government involvement in developing partnerships with firms.

6.6 Discussion and Conclusion

This chapter examined the development process of HaUI's industry engagement mechanism and activities, with special attention being paid to how HaUI has learned and adapted foreign models presented by donors. After actively exploring various foreign models related to industry engagement, HaUI selected the Japanese training process management system for the improvement of TVET programs and has been

attempting to localize it, taking into account their current capacities and the extent of support they receive from industry.

Even after the completion of the HaUI-JICA Project, HaUI has continued to customize the Japanese model with confidence enhanced by capacity building and pragmatism. The accumulation of small successes, which HaUI achieved with hands-on assistance from JICA, provided them with confidence and let them decide to invest in the development of a coordination mechanism, namely the CPA. This means that HaUI improved industry engagement activities and then developed its institution. In other words, they enhanced 'ingredients' of industry engagement and then started developing an institutional 'framework.' On the other hand, HaUI has not been able to widely disseminate their model due to lack of government recognition and support, which is attributed to weak involvement of government during the early stage of project activities.

Though HaUI selected the Japanese training process management system as a starting point for developing their industry engagement system, it is predicted that HaUI will continue to adapt the current model. There are various possibilities for the future transformation of HaUI's industry engagement system (see Fig. 6.4). It may aim to fully adopt the Japanese training process management system, which encourages TVET institutions to acquire information on industry skills needs not only through formal meetings for curriculum development but also through other forms of interaction, including company visits. Another possibility is that since HaUI continues to study Western models, they may implement the DACUM method and CBT to the fullest extent, taking advantage of increasing number of partner firms. Certainly, there is also a possibility that they will generate a unique model, which may not exactly follow those developed in Japan or Western countries. In short, translative adaptation is not a static but dynamic process, as far as the recipients of foreign models keep developing their absorptive capacity through learning by doing processes and maintaining a sense of strong ownership. Following up with this transformation process will provide useful lessons to other developing countries, in particular middle-size countries like Vietnam, which have certain size of population and land and are attempting to promote industrialization by utilizing foreign direct investment (FDI) but struggle with a lack of dynamism in skill demand.

Finally, this research also suggests that strong ownership has enabled HaUI to conduct active learning and adaptation. However, it could not determine how HaUI acquired this strong sense of ownership. It may be an endogenous factor such as a national characteristic of the Vietnamese people [37]. Another possibility is that, while it is endogenous, it could have been enhanced by certain events during the process of learning. Further analysis of how HaUI acquired or developed this strong sense of ownership will provide valuable information for future development cooperation in a country that may not possess such a strong sense of ownership and is unable to adapt foreign models at their own choice.

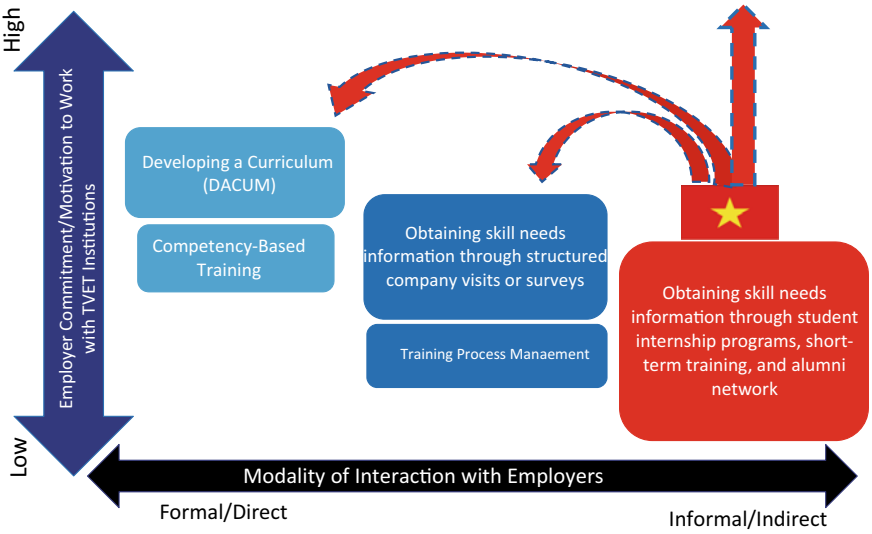

Fig. 6.4 Future direction of HaUI's industry engagement system (*Source* Drafted by the author)

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Chapter 7
Promoting *Kaizen* in Africa: 10-Years of Experience of Japanese Cooperation in Tunisia and Ethiopia

Tsuyoshi Kikuchi

7.1 Introduction

The Japan International Cooperation Agency (JICA) started a quality and productivity improvement project (hereinafter referred to as 'the *Kaizen* Project') in Tunisia in 2006, the first *Kaizen* Project in Africa. After three years, the third *Kaizen* Project in Africa began in Ethiopia in 2009. Since then, JICA has been expanding its development cooperation to *Kaizen* in Africa to contribute to the continent's industrial development. In June 2022, South Africa became the ninth country to receive JICA's cooperation for *Kaizen* Project. These projects have been initiated based on bilateral agreements between Japan and African governments, and now, more countries are integrated under the multilateral framework of the Africa Kaizen Initiative (AKI)[1] in collaboration with the African Union Development Agency-the New Partnership for Africa's Development (AUDA-NEPAD) and the Pan-African Productivity Association (PAPA) [18].

Because *Kaizen* is the Japanese bottom-up participatory approach to quality and productivity improvement, it is vitally important for each African country to customize the original Japanese model in such a way suitable to local conditions when development cooperation is provided by Japan. Tunisia and Ethiopia have implemented *Kaizen* Projects three times, assisted by JICA, over a period of nearly

[1] The Africa Kaizen Initiative (AKI) was announced by Japanese Prime Minister Abe and the New Partnership for Africa's Development (NEPAD) at the Sixth Tokyo International Conference on African Development (TICAD VI) held in Nairobi, the capital of Kenya, in August 2016. AKI aims to improve the quality and productivity of factories in Africa through the introduction of *Kaizen*. In April 2017, AKI was officially launched with the joint sponsorship of JICA and the NEPAD.

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10 years. Their experiences show differences and similarities in *Kaizen* implementation in the two countries and illuminate the implications and challenges for future sustainable development of *Kaizen*.

The objectives of this chapter are to review achievements of the JICA-supported *Kaizen* Projects for Tunisia and Ethiopia over a period of 10 years and analyze: (i) how Japan-born *Kaizen* was introduced and disseminated in different institutional settings, reflecting local conditions; and (ii) what are their implications and challenges of promoting *Kaizen* sustainably.

The chapter is organized as follows. First, the introductory section defines the term 'achievement' as used in this chapter. Section 2 describes the history of JICA development cooperation in Tunisia and Ethiopia over the last 10 years. Section 3 compares the achievements of *Kaizen* Projects in both countries, and Sect. 4 draws lessons and implications from the comparison and identifies further challenges. Section 5 concludes the chapter.[2]

In both Tunisia and Ethiopia, most local enterprises participating in *Kaizen* Projects enjoyed positive results such as improvements in quality and productivity, reduced costs, and/or shorter delivery times. What do these achievements signify for their future businesses? Their significance for the future lies not simply in these achievements but relates to whether or not a mechanism, organization, or system to produce them has been established. For example, the development of human resources should not simply mean the number of people trained but the number of people trained to become trainers or consultants who can provide technical guidance and service on *Kaizen* for customers (private and public enterprises). There is also a question of whether or not a mechanism has been established to continually train managers and workers in *Kaizen*.

The term 'achievement' in this chapter is used not simply to mean a result but to indicate something with potential for sustainable development of *Kaizen* (especially after the completion of JICA cooperation). Here, achievements that enable this form of sustainable development are classified into three pillars. The first pillar is the formulation of the country's unique vision, policy, and strategy for the future, together with a clear target direction and activities for the dissemination of *Kaizen*. The second pillar is the establishment of a mechanism, organization, and system to make such activities concrete. The third pillar is the existence of developed and accumulated capacity to make such mechanisms, organizations, and systems functional. The 'capacity' is divided into three levels: individual, organizational, and network levels. Specifically, capacity here is conceptualized as the ability to learn, modify or customize, and disseminate *Kaizen* from the perspective of technology transfer [24]. All pillars are formed by reflecting local conditions, that is, political, economic,

[2] It should be noted that the author compared the achievements over 10 years of JICA-supported *Kaizen* Projects in Tunisia and Ethiopia, based on the materials and statistical data obtained by the end of the project period in each country. The end of JICA project is December 2021 in Tunisia and July 2020 in Ethiopia, respectively. If situations that affected *Kaizen* dissemination activities have occurred since then (for example, changes in the political and social environment, administrative organization), explanatory notes will be provided.

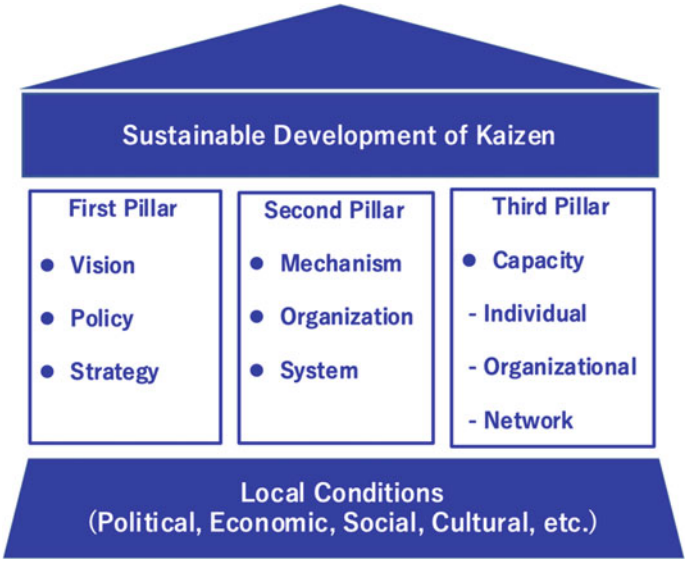

Fig. 7.1 Three pillars for sustainable development of *Kaizen* (*Source* Created by the author)

social, or cultural conditions. The basic understanding of the author is that sustainable development of *Kaizen* is feasible only when all of these three pillars are present side by side. Thus, this chapter uses the three pillars as a framework of comparative analysis. Figure 7.1 shows an image of the above description.

A supplementary explanation is given regarding the relationship between the three pillars and the 'local conditions' in Fig. 7.1. The local conditions can either provide a positive foundation of support for these pillars as, or they could affect the pillars negatively, breaking them down. For example, 'customization' and 'translative adaptation'[3] are cases in which the local conditions are adapted or accepted when foreign technologies and knowledge are introduced in recipient countries through donor-funded projects. But, internal conflicts, political upheaval, or the COVID-19 pandemic are cases which cannot be controlled by the projects and negatively affect their achievements or pillars.

[3] 'Translative adaptation' is a term invented by a cultural anthropologist Prof. Keiji Maegawa, and is the basic concept that runs through this volume. For more details, see Chap. 1 of this volume and Jin and Ohno [18]. In this chapter, 'translative adaptation' is treated as synonymous with customization.

7.2 History and Key Features of JICA Cooperation in Tunisia and Ethiopia

JICA cooperation for the *Kaizen* Projects in Tunisia and Ethiopia consists of three stages (Table 7.1). The total project period of these three stages is roughly 10 years in both countries.

JICA's first-stage cooperation for Tunisia and Ethiopia can be described as pilot projects. The results confirmed that the concept and methods of *Kaizen* were not only effective for quality and productivity improvement of enterprises in both countries but also transferable [22, 25, 26, pp. 152–153], resulting in the governments of both countries making a request to Japan for second-stage cooperation. *Kaizen* can be classified into basic, intermediate, and advanced levels according to the degree of challenge [35, p. 77].[4] The second-stage cooperation aimed at fostering human resources capable of providing training, guidance, and consulting services for enterprises using basic *Kaizen* ways of thinking and methods. The third-stage cooperation aimed at fostering human resources capable of providing guidance on intermediate and partially advanced-level *Kaizen.*

The objective of the first *Kaizen* Project supported by JICA in Tunisia was to conduct a fact-finding survey of companies in the country, introduce Japan-born *Kaizen* methods and ways of thinking to selected pilot companies, and confirm their effectiveness. Based on the results, it aimed to formulate an action plan with an implementation system for the project. In Tunisia, the core organization to receive JICA cooperation (counterpart organization) has been the Management Unit of the National Program of Quality Promotion (*Unité de Gestion du Program National de Promotion de la Qualité*: UGPQ) of the Ministry of Industry and SMEs (*Ministere de l'Industrie de PME*: MIPME). The UGPQ was established in 2005 for the purpose of promoting the Tunisian Enterprise Upgrading Program (*Program de Mise à Niveau*: PMN). Its main activities are to provide support (training and consultation) for enterprises in relation to manufacturing technologies and international quality standards (ISOs) and to train newly recruited staff members.

During the period of JICA's second-stage *Kaizen* Project, the Jasmine Revolution broke out, toppling the administration which had been in power for 23 years. This change of government resulted in a suspension of the prioritized work under the project in order to explore a concrete plan to upgrade the UGPQ from a time-bound to a permanent organization. In January 2016, the MIPME was reorganized as the Ministry of Industry (*Ministère de l'Industrie*: MI), which then became the Ministry of Industry and Commerce (MIC) in September 2016 through a merger with the Ministry of Commerce. The MIC was again reorganized as the Ministry of Industry and SMEs (MIPME) in September 2017 [15].

[4] Basic *Kaizen* mainly deals with problems which can be solved through a bottom-up approach from the production floor. In the case of advanced *Kaizen*, problem-solving that solely relies on the production floor is difficult and guidance from the top management or a higher department is essential [11, p. 65].

Table 7.1 History of JICA cooperation for *Kaizen* Projects in Tunisia and Ethiopia

JICA cooperation	Tunisia Project title/Duration/C/P	Ethiopia Project title/Duration/C/P
First stage	The Study on the Master Plan for Quality/Productivity Improvement Period: August 2006–July 2008 C/P: UGPQ, CETIME, CTAA	The Study on Quality/Productivity Improvement Period: October 2009–May 2011 C/P: KU
Second stage	The Project for Quality/ Productivity Improvement (Phase I) Period: September 2009–March 2013 C/P: UGPQ, CETIME, PACKTEC	The Project for Capacity Building for Dissemination for Quality/Productivity Improvement (*Kaizen*) Period: November 2011–October 2014 C/P: EKI, TVET
Third stage	The Project for Quality/ Productivity Improvement (Phase II) Period: January 2016–December 2021 C/P: UGPQP, CETIME, CETTEX, CTC	The Project on Capacity Building for *Kaizen* Implementation for Quality and Productivity Improvement and Competitiveness Enhancement Period: July 2015–July 2020 C/P: EKI

Source Elaborated by the author based on various JICA reports on the *Kaizen* projects in Tunisia and Ethiopia
Notes 1. C/P: Counterpart agency to receive JICA's cooperation; 2. In 2016, UGPQ (Tunisia) was renamed to UGPQP; 3. In 2022 (after the termination of the third stage of JICA cooperation), EKI (Ethiopia) was renamed to KEC (Kaizen Excellence Center); 4. Although the Project Design Matrix (PDM) of the third-stage cooperation for Tunisia lists the UGPQP and three national technical centers[5] (CETIME, CETTEX, and CTC) as the principal target organizations, an additional five technical centers received technology transfer (through training and guidance) in consideration of the need to widely disseminate *Kaizen* [15]; 5. The author participated in the first stage (2006–2008) of the *Kaizen* Project for Tunisia and the second stage (2011–2014) of the *Kaizen* Project for Ethiopia

[5] In Tunisia, there are eight national technical centers under the Ministry of Industry: Technical Center of Mechanical and Electrical Industries (CETIME), Technical Center for Agribusiness (CTAA), Technical Center for Packing and Packaging (PACKTEC), Technical Center for Textiles (CETTEX), Technical Center for Chemistry (CTC), National Center for Leather and Shoes (CNCC), Technical Center for Wood and Furniture Industry (CETIBA), and the Technical Center for Construction Materials, Ceramics and Glass (CTMCCV).

In 2016 during the third-stage cooperation period, the UGPQ was renamed the Management Unit of the National Program of Quality and Productivity Promotion (*Unité de Gestion du Program National de Promotion de la Qualité et la Productivité*: UGPQP). In this chapter, any reference to the UGPQ from the third-stage cooperation after this change uses the term 'UGPQP' or 'UGPQ/UGPQP' depending on the particular context.

Since its establishment, the UGPQ/UGPQP has always been a time-bound organization, despite the above organizational changes. It has acted as the window and the coordinator for JICA-supported projects and dealt with individual projects using suitable consultants loaned from the national technical centers under the jurisdiction of the MIPME. Therefore, the system to receive JICA cooperation is essentially the result of collaboration between the UGPQ/UGPQP and national technical centers.

In Ethiopia, the JICA-supported *Kaizen* Project started in 2009, in response to a strong request from then Ethiopian Prime Minister Meles Zenawi. The objective was to establish a system of sustainable dissemination of *Kaizen* for private enterprises, focusing on selected pilot enterprises. In Ethiopia, the core organization acting to receive JICA cooperation is the Kaizen Unit (KU) established as a section of the Ministry of Industry (MOI) during the first stage of cooperation (2009–2011). During this period, the government of Ethiopia confirmed the effectiveness and adaptability of *Kaizen* concepts and methods for the country and prior to the commencement of second-stage cooperation (2011–2014) expanded and reorganized the KU into the Ethiopian Kaizen Institute (EKI), an independent organization disseminating *Kaizen* in Ethiopia [26].

At the time of the commencement of second-stage cooperation, the number of personnel at the EKI was 10 (including the Director), all of whom had been previously trained as members of the KU. As of June 2020 (the final year of the third stage of *Kaizen* Project), the EKI had as many as 154 staff, including the Director General and other senior staff members, 109 of whom are *Kaizen* consultants [13, p. 3]. The supervising Ministry for the EKI was originally the MOI. For the second-stage cooperation, while the EKI acted as the core counterpart organization, Technical and Vocational Education and Training (TVET) under the jurisdiction of the Ministry of Education (MOE) also participated as a counterpart organization. The other principal organizations cooperating with EKI in disseminating *Kaizen* in Ethiopia are industrial development institutes (MIDI, TIDI, LIDI, and so on)[6] and Regional Kaizen Institutes (RKIs).

Although EKI had been under the jurisdiction of the MOI since its establishment in 2011, during the third-stage cooperation, the supervising ministry was changed to the Ministry of Public Service and Human Resource Development (MoPSHRD) in October 2015 to disseminate *Kaizen* to the public service sector in addition to the manufacturing sector. Afterwards the MoPSHRD was renamed the Civil Service

[6] Metal Industry Development Institute (MIDI), Textile Industry Development Institute (TIDI), Leather Industry Development Institute (LIDI), and others of the Ministry of Industry (MOI). These 'institutes' were renamed to 'centers' and reorganized into the Manufacturing Industry Development Institute in April 2022 [4].

Commission (CSC) under the direct control of the Prime Minister's Office in October 2018 [13].

Generally, for a project to be implemented as designed, it is desirable to avoid events that cannot be controlled by the project team during the implementation process. But multiple events of this type occurred in Tunisia, including the Jasmine Revolution (2010–2011), the repeated reorganization of the Ministry supervising UGPQP, the repeated change of Minister, and so on. In the year before the scheduled final year, the COVID-19 pandemic tore around the globe. Due to such unexpected events, it was decided to extend the completion of the third-stage *Kaizen* Project for Tunisia from July 2020 to the end of 2021.

Ethiopia also faced an unexpected political change. The Oromo protest happened during the period of the third-stage cooperation, and the Prime Minister changed in 2018. However, the negative impact on the *Kaizen* Project was limited even though the supervisory authority of EKI was changed from the MoPSHRD to the CSC.[7]

In 2020, the third-stage *Kaizen* Project entered its final year in Ethiopia. The negative impact of COVID-19 resulted in the early departure for Japan of the JICA expert team in March 2020. However, because the planned activities under the third-stage project in Ethiopia had almost been completed, the pandemic had limited effects on the project. Ethiopia has been fortunate that no events beyond the control of the project team occurred in the 10-year period, unlike in Tunisia. Accordingly, it can be concluded that the environment for the implementation of the *Kaizen* Projects in the last 10 years has sometimes been tougher for Tunisia than for Ethiopia.

7.3 The Achievements of the *Kaizen* Projects in Tunisia and Ethiopia

This section compares the achievements of the *Kaizen* Projects in the two countries in the context of the three achievement pillars conceptualized in the introduction section: (i) formulation of vision, policy, and strategy; (ii) establishment of mechanism, organization, and system; and (iii) development and accumulation of capacity. It also analyzes differences and similarities how the two countries have realized such achievements, giving attention to respective local conditions.

[7] After the completion of JICA-supported project in July 2020, the supervisory authority was further changed from CSC to MOI, and Ethiopian Kaizen Institute (EKI) was renamed as Kaizen Excellence Center (KEC) in 2022.

7.3.1 Formulation of Vision, Policy, and Strategy

What policy documents are available in Tunisia and Ethiopia that indicate the way of thinking and direction of activities in the form of a vision, policy, and strategy for the dissemination of *Kaizen* in the coming years? Tunisia has an Annual Performance Plan (APP), an industrial plan prepared by the Ministry in charge of the industrial sector. 'Productivity improvement' in addition to quality improvement has been recognized as an important pillar of Tunisia's industrial policy in this APP. The National Productivity Promotion Committee (NPPC) was established on 24 March, 2021 to promote productivity improvement in Tunisia (Decree of the MIEM).[8] One of the important tasks of the Committee is to formulate policy for promoting productivity within private companies as well as public organizations.

Ethiopia has the Growth and Transformation Plan II (GTP II: 2015/2016–2019/2020). GTP II places emphasis on quality/productivity improvements and the enhancement of competitiveness as the keys to achieve economic transformation, with *Kaizen* considered the principal tool to achieve them [2, 31].[9] As of February 2020 when the author visited Ethiopia, the EKI was formulating the 10-Year Strategic Reform Plan (2020–2030) as a new edition of this plan. What is notable about these efforts in Ethiopia is the strong interest in and understanding of *Kaizen* on the part of the late Prime Minister Meles Zenawi. Under his strong leadership, the JICA-supported *Kaizen* Project materialized, and the EKI was established in October 2011 as the core organization for disseminating *Kaizen.*[10] 'The Policy Dialogue on Industrial Development of Ethiopia' assisted by JICA had a positive impact on that decision (see Chap. 5).[11]

During the period of JICA-supported projects, EKI developed a unique model for *Kaizen* dissemination in Ethiopia by learning from successful experiences and approaches adopted in Japan and other countries and adapting them to the country-specific context. This Ethiopian approach is named as the TIISO model consisting of five stages: testing, institutionalizing, implementing, sustaining, and ownership [26]. The TIISO model became one of the tools included in Ethiopia's strategy to disseminate *Kaizen*.

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[8] Proclaimed by *Journal Officiel de la République Tunisienne*, April 2, 2021.

[9] 'The Ethiopian government adopted *Kaizen* as an exemplary approach and tool for growth and development' [2].

[10] Many researchers have pointed out that the greater than expected and remarkable achievements of the *Kaizen* Project in Ethiopia can be attributed to the strong leadership of the late Prime Minister Meles [3, 17, 26, 31, 34].

[11] The Policy Dialogue on Industrial Development of Ethiopia started in 2009 in response to a request by the late Prime Minister Meles (GRIPS 2016). The industrial policy dialogue is a modality of assistance aimed at transferring the experience of development, especially in the methodology of industrial policy formulation, of East Asia to developing countries (JICA and GRIPS Development Forum 2011, 12). GRIPS Professor Izumi Ohno who participated in this industrial policy dialogue stated that 'the policy dialogue was closely entangled with the process of introducing and developing *Kaizen*, producing a synergy effect between actual practice and policy formulation' [31, p. 20].

7.3.2 Establishment of Mechanism, Organization, and System

Both countries have made efforts to create and consolidate the mechanisms, organizations, and systems for the dissemination of *Kaizen*. Below is a comparison between Tunisia and Ethiopia that takes into consideration such efforts as: (i) national-level body and system, counterpart organization for JICA cooperation, and the principal collaborating organizations; (ii) human resources development system; (iii) qualification certification system; (iv) *Kaizen* dissemination system for enterprises; (v) awards scheme; (vi) collaboration with private associations; and (vii) collaboration with universities and higher education institutions.

7.3.2.1 National-Level Body and Counterpart Organization for JICA Cooperation

In both countries, counterpart organizations have national-level superior bodies in addition to supervising ministries. However, the system of counterpart organizations that receive JICA's cooperation is different in Tunisia and Ethiopia.

In Tunisia, the NPPC is a ministerial-level national body to promote productivity improvement. Although the NPPC focuses on productivity, it is understood as a national level organization responsible for disseminating *Kaizen,* since it carries out activities such as operating the *Kaizen* trainer qualification system and formulating policy to promote productivity. The committee members are ministries responsible for industry, economy and finance, higher education and scientific research, and professional training institutes; private associations; labor unions; and other knowledgeable persons. This membership is relevant to the *Kaizen* network discussed later in this chapter. The counterpart organizations for JICA cooperation are the UGPQ/UGPQP in collaboration with national technical centers under the jurisdiction of the same ministry.

In Ethiopia, the National Kaizen Council (NKC) was established in 2013 by Prime Minister Hailemariam Desalegn, with the EKI serving as the secretariat. The chairman of this Council is the Prime Minister.[12] The Council discusses the future vision for the dissemination of *Kaizen* and the direction for a national movement [26]. The counterpart organization for JICA cooperation was the KU in the first stage, and then the EKI beginning in the second-stage project.

There are two major differences between Tunisia and Ethiopia in regard to the organizational aspects of JICA cooperation. First, the UGPQ/UGPQP and the national technical centers have received training on *Kaizen* as a group of counterpart organizations, while the KU/EKI has been the core organization for such training in

[12] Under the administration of Prime Minister Abiy Ahmed, NKC has not met in recent years. Separately, the Ethiopia Tamirt Movement was launched by the Prime Minister in May 2022, and the Ethiopia Tamirt National Council has been established, chaired by the Minister of Industry. *Kaizen* promotion is regarded as part of this national movement [5].

Ethiopia even though TVET was added in the second stage of cooperation. Simply put, the organizational structure to receive JICA cooperation is 'the collaborative type' in Tunisia and 'the independent type' in Ethiopia. Which one is better or which one to be chosen will depend on the policies and conditions of each country. This point will be discussed in Sect. 7.4.3.

The second difference between Tunisia and Ethiopia is in the supervisory body of the counterpart organization. The supervisory body of UGPQP is the MIEM, but that of the EKI has been transferred from the Ministry in charge of industry to the CSC under the direct control of the Office of the Prime Minister.[13] The reason for the transfer to CSC is that the Ethiopian government has a policy of spreading *Kaizen* to the general public beyond the industrial sector. The idea of spreading the concept of *Kaizen* to the private and industrial sectors as well as the public sector is also seen in Tunisia from the membership of the NPPC, as mentioned above.

7.3.2.2 Human Resources Development System

Tunisia and Ethiopia have established *Kaizen*-related human resources development systems through JICA cooperation. The basic framework for human resources development is a combination of theoretical training (classroom training: CRT) and practical training (in-company training: ICT) with emphasis being placed on ICT. Practical training means that the trainees attempt to apply theories of *Kaizen* that they learn during CRT on the actual production floors of enterprises, together with a plant manager and workers of an enterprise. In other words, practical training (i.e., ICT) is 'on-the-job training,' which takes a 'learning-by-doing approach' or an 'experience-based approach.'

In Tunisia, human resources development includes training using a simulated production line in addition to CRT and ICT. The training with the simulated production line is a system that allows the trainees to practice the production of experimental products or the assembly of components using standard production or assembly equipment. This training method was developed by the counterparts themselves after training in Japan. Tunisia is the only country using such a method for human resources development among the nine African countries where JICA's *Kaizen* Projects are implemented [15].

The principal human resources development program in Tunisia is the Training of Trainers (ToT) Program, which consists of three-levels that take four years to complete: *Kaizen* Basic Trainer (BT), *Kaizen* Advanced Trainer (AT), and *Kaizen* Master Trainer (MT). The program is also designed for the private sector. The fee for such a training course is fairly expensive for small and medium enterprises, but the government of Tunisia has established a relevant subsidy system [13, p. 17].

Similarly, in Ethiopia, the basic training framework consists of CRT and ICT. The human resources development concerning *Kaizen* in Ethiopia can be classified

[13] The supervisory body of EKI was changed to MOI from CSC in 2022 [4].

into three-levels: basic, intermediate, and advanced. Basic-level and intermediate-level *Kaizen* were transferred to EKI consultants by the JICA expert team during the second- and third-stage cooperation periods, respectively. The standard duration of an intermediate level *Kaizen* program in Ethiopia is one month for CRT and seven months for ICT.

During the period of the JICA's third-stage cooperation for Ethiopia, the Management Skill Development Program was developed. Because of the need to train trainers to complement this program, the ToT on Management Skills Program was also developed. There is a slight difference between Tunisia and Ethiopia in terms of human resources development. The CRT in both countries includes intermediate (and partially advanced-level) *Kaizen*, giving the impression that the technical contents are virtually the same in both countries, although the point of emphasis in the training differs. Tunisia aims to train *Kaizen* trainers[14] while Ethiopia emphasizes the training of *Kaizen* consultants.[15] This difference relates to the name of the qualification in the qualification certification system of each country.

What is the difference between the training of *Kaizen* trainers and the training of *Kaizen* consultants? The aim of human resources development in the *Kaizen* Project is to develop people who can solve the problems related to production management (such as quality improvement, productivity improvement, cost reduction, and delivery time decreases) that companies face. In this respect, even if there is a difference of the emphasis of training between the two countries, i.e., development as a consultant or development as a trainer, it is assumed that trained personnel are more or less proficient in both cases. Another difference between Tunisia and Ethiopia is that Tunisia in principle charges a fee for training and consultation for private enterprises. This is an issue for Ethiopia to consider in the coming years [13].

How about the similarity in human resources development between Tunisia and Ethiopia? As explained, the contents of the training were reviewed, modified, or customized in their own ways based on what they had initially learned from the JICA expert team. This is one example of how the two countries have tackled customization, reflecting local situations.

7.3.2.3 Qualification Certification System

As described above, the qualification title differs between Tunisia (Trainer) and Ethiopia (Consultant). The qualification certification system in Tunisia was introduced during JICA's third-stage cooperation, and three types of qualification are certified: *Kaizen* Basic Trainer (BT), *Kaizen* Advanced Trainer (AT), and *Kaizen* Master Trainer (MT). In February 2020 when the author visited Tunisia, there was

[14] JICA's third-stage cooperation for Tunisia is said 'to have attempted to foster such individual qualities as enthusiasm, cooperativeness, leadership, and so on; all of which are required for the training of trainers' [15, p. 28].

[15] The training of a consultant focuses on problem identification and problem solutions discovered by themselves.

an ongoing process to formulate a ministerial ordinance to have these qualifications certified by the government (MIPME) [15]. The ministerial decree was issued on 24 March, 2021 with the establishment of the NPPC.

In Ethiopia, the *Kaizen* Consultant Certification, Accreditation and Registration System (CARS) was established in 2017 during the third-stage cooperation to ensure the quality of *Kaizen* services. There are three types of consultant qualifications: Basic-level Consultant (BC), Intermediate-level Consultant (IC), and Advanced-level Consultant (AC); but the current qualification holders are either BC or IC [13].

7.3.2.4 *Kaizen* Dissemination System for Enterprises

In both countries, the system to disseminate basic *Kaizen* technologies was established during JICA's second-stage cooperation. In the third-stage cooperation, emphasis is placed on the transfer of intermediate-level *Kaizen* technologies in both countries, and in Tunisia the transfer of some advanced-level technologies was attempted through ICT. However, the human resources capable of making this system function are limited both qualitatively and quantitatively, and it is difficult to fully meet the needs of private enterprises. It is essential for trainers and consultants to build up their practical experience in the coming years.

The case of EKI's approach to spread *Kaizen* to enterprises can be seen as one example of 'customization.' The top management of EKI was very interested in promoting *Kaizen* through small group activities and planned to disseminate *Kaizen* through the formation of the *Kaizen* Promotion Team (KPT) that integrated the activities of the Japanese 5S Committee, QC Circles, TPM, and Cross-Functional Teams step-by-step [26, p. 174]. This approach was designed during JICA's first *Kaizen* Project (2009–2011) and was actively promoted in the second-stage cooperation (2011–2014), not only in private enterprises but also in state-owned enterprises.

The number of KPTs is increasing every year and currently has reached over 20,000. It is said that Ethiopia has a long history of small group activities culture. People in rural areas work together in teams in their agricultural fields. In urban areas, there are different voluntary self-help groups and associations to help each other. For instance, a coffee ceremony in any community is a group event. In the ceremony, all talks are about business, local security, and the exchange of information. It seems that due to such societal culture, a form of small group activity is more acceptable among Ethiopians.[16]

[16] Information provided by former Director General of EKI, Getahun Tadesse Mekonen, the co-author of Chap. 4 of this volume.

7.3.2.5 Awards Scheme

The awarding of enterprises is important in two ways. First, it gives an extra incentive to enterprises that have already introduced *Kaizen* by recognizing their significant achievements. Second, it promotes a need or demand for *Kaizen* on the part of those enterprises that have not yet introduced it. When the author visited Tunisia in February 2020, the MIPME was in the process of formulating a ministerial decree to establish a *Kaizen* Awards Scheme during the third-stage cooperation.[17] The decree regarding the Awards Scheme was issued on 24 March, 2021 with the establishment of the NPPC. In Ethiopia, the National *Kaizen* Awards Scheme was established in 2011.

It is said that each country's Awards Scheme was established with reference to the Deming Prize, founded by the Union of Japanese Scientists and Engineers (JUSE) in 1951, the Japan Quality Award, founded by the Japan Productivity Center (JPC) in 1995, and the Malcom Baldrige National Quality Award, founded by the National Institute of Standards and Technology (NIST) within the US Department of Commerce in 1987.

7.3.2.6 Collaboration With Private Associations

In both Tunisia and Ethiopia, the core organization to promote the dissemination of *Kaizen* is a public body. Although it may be the case that a public body acts as a driving force in a developing country in the stage of industrial catch-up, the dissemination of *Kaizen* should be eventually driven by the initiative of the private sector. Accordingly, the role of the government of a developing country is to create an environment in which private associations, such as industrial, management, and consulting associations, are fostered and developed. Collaboration between the core organization (at present public body) and private associations are essential for the long-term dissemination and development of *Kaizen*.

Large-scale private associations in Tunisia are the Tunisian Confederation of Industry, Trade and Handicrafts (*Union Tunisienne de l'Industrie, du Commerce et de l'Artisanat*: UTICA)[18] and the Confederation of Citizen Enterprises of Tunisia (*Confederation des Entreprises Citoyenne de Tunisie*: CONECT),[19] both of which are members of the Joint Coordinating Committee (JCC) for the third-stage *Kaizen* Project of JICA. The UGPQP collaborates with these two bodies to jointly host

[17] In 2008 during the period of JICA's first-stage cooperation in Tunisia, the First Grand Prix of the President was established for the Improvement of Quality and Innovation. This institutional arrangement was abolished during the Jasmine Revolution in 2010–2011 [15].

[18] The UTICA was established in 1947 and its membership includes some 150,000 private enterprises in the industrial, commercial, service, and handicraft sectors, excluding the tourism and financial sectors. It is part of the Tunisian National Dialogue Quartet which was awarded the Nobel Peace Prize in October 2015 [15].

[19] The CONECT is an association of enterprise managers in diverse business fields, including the public sector and foreign subsidiaries, in Tunisia [15].

seminars and dispatches lecturers to seminars organized by them. The relationship between the eight national technical centers and private enterprises includes the provision of various technical services by these centers for private enterprises and the representation of leading private enterprises on the board of directors of the technical centers in eight technical fields. In other words, each center is operated by a public–private partnership type board of directors.

In Ethiopia, in the third-stage cooperation period, no collaborative relationship has emerged between the EKI and private associations other than the Ethiopian Industrial Engineers Association (EIEA). EIEA is entrusted to conduct part of the work related to the CARS examination. However, in Ethiopia, private associations like UTICA and CONECT in Tunisia are not yet developed. Based on the above, the collaboration between the public sector (UGPQP) and private sector appears to be relatively more advanced in Tunisia.

7.3.2.7 Collaboration With Universities and Higher Education Institutions

Universities and higher education institutions can play a significant role in industrial development. According to Japan's experience in the *Kaizen* field, for example, universities have played an important role together with private associations in the study of *Kaizen* (systematization and experimental application), development of new methods, and human resource development [16, 19, 20, 21, 24].

In Tunisia, the government, especially the MIPME, emphasizes academic-industrial collaboration in its industrial policy [15]. During JICA's third-stage cooperation, a dissemination and enlightenment seminar on quality and productivity improvement (*Kaizen*) for university lecturers and a seminar for university students have been organized within the framework of the *Kaizen* Project, targeting several universities and higher educational institutions. The seminar for university lecturers involved not only *Kaizen* theories but also practical training using a simulated production line.

The University of Tunis has a Higher National Engineering School (*Ecole Nationale Superieure d'Ingenieure de Tunis*: ENSIT), which has the status of a faculty and offers an industrial engineering course. The curriculum for this course includes such lecture themes related to *Kaizen* as production control, quality management, and supply chains.[20] The ENSIT has a strong interest in *Kaizen* and hopes therefore to strengthen its collaboration with the UGPQP and national technical centers.

What is notable in Ethiopia regarding links between *Kaizen* and universities is the fact that a *Kaize*n master's degree course as well as a *Kaizen* PhD course have been established. A two-year master's degree course started at Mekelle University in March 2014 under the guidance of a Japanese university professor (Hiroshi Osada, Professor Emeritus, Tokyo Institute of Technology). A four-year PhD course was

[20] Based on ENSIT's brochure introducing its curriculum.

introduced at the same university in October 2018 during the third stage of JICA cooperation [13].[21]

7.3.3 Development and Accumulation of Capacities

The 'mechanism, organization, and system (the second pillar)' for the future dissemination of *Kaizen* in Tunisia and Ethiopia can be regarded as a device to materialize the 'vision, policy, and strategy (the first pillar)' for the future of *Kaizen*. What is required as the next pillar is the capacity to make these devices actually function. The term 'capacity' (the third pillar), as explained in the introduction of this chapter, is subdivided into individual, organizational, and network capacity.

Individual capacity means the capacity of individual trainers or consultants engaged in the work to disseminate *Kaizen*. Organizational capacity means the capacity of a core organization to disseminate *Kaize*n and to operate the organization itself.[22] In addition, the ability of the core organization to function as a center of excellence in neighbouring countries where *Kaizen* has not yet spread can be also considered organizational capacity. Network capacity means the capacity generated by a network with other members being related organizations and bodies, associations, universities, and so on. For the sustainable dissemination and development of *Kaizen*, a network to ensure linkage and cooperation among related organizations and bodies, especially an industry-government-academic network, is essential [24]. As such, the relationship between these three levels involves the organizational level capacity to make up for the limitation of individual level capacity, and the network level capacity to make up for the limitation of the organizational level capacity.

JICA defines 'capacity' as 'the ability of developing countries to deal with development issues on their own' [8, p. 5], and conceptualizes 'capacity development' as 'the process of improving the problem-solving capacity of developing countries as a whole at multiple levels, including individuals, organizations, and societies' [8, p. 1].[23] It can be said that 'individual, organization, and society' roughly correspond to the three levels of 'individual, organization, and network' capacity mentioned in this chapter. But, strictly speaking, JICA's definition of 'society' is a broader concept than 'network' used here.

It is not easy to qualitatively determine the three types of capacity. This chapter only looks into the quantitative aspect of capacity, including the number of training

[21] As of June 2022, neither the master's course or the PhD course is operating due to internal conflict that broke out in November 2020 in Ethiopia.

[22] The operation of an organization includes the operation and management of training programs, qualification systems, awards schemes, and the gathering and analysis of information and data.

[23] Hosono et al. [7] refers to the widely cited definition of 'capacity' from OECD/DAC [29], which is the ability of people, organizations, and society as a whole to manage their affairs successfully. UNDP [37] also discusses 'capacity development' at three levels: individuals, organizations, and society.

participants (Table 7.2), the number of those who have completed training, or the number of people who have obtained a qualification.

In the case of Tunisia, individual capacity is represented by the number of qualified persons in the different stages of cooperation with JICA (Table 7.3). Most of them belong to UGPQP and national technical centers, so their individual capacities consist of part of the organizational capacity.

The next topic is the capacity of a core organization for the dissemination of *Kaizen* in Tunisia. While the UGPQ/UGPQP is the core organization, it has been a time-bound organization with its status renewed every five years. During JICA's third-stage cooperation period, the staff members consist of a limited number of full-time UGPQP employees and Master Trainers temporally transferred from national technical centers. The UGPQP has been receiving JICA cooperation to train personnel (MT, AT, and BT) with the national technical centers. It has also established a system to improve such activities as organizational capacity, since the UGPQP has been engaged in training and technical guidance for enterprises using trained personnel.

In addition to managing training and guidance for enterprises, the operation of the UGPQP includes managing qualification systems, award schemes, and various events and also the gathering and analysis of information and data. Therefore, the manpower of the administration department must be increased since a greater number of such activities are planned in the coming years.

As the core organization of *Kaizen* dissemination, UGPQP has another capacity that has been accumulated over the past decade. It has the function of a center of excellence that shares Tunisia's experience of *Kaizen* dissemination with neighbouring countries, especially French-speaking African countries. This capability may be

Table 7.2 Numbers of trainees and participating companies for all stage projects in Tunisia and Ethiopia

Project Stage and Period	Tunisia (T)		Ethiopia (E)	
First-stage Project T: 2006–2008 E: 2009–2011	Trainees Companies	15 29	Trainees Companies	10 30
Second-stage Project T: 2009–2013 E: 2011–2014	Trainees Companies	24 50	Trainees EKI TVET Companies LM MSE	57 131 51 129
Third-stage Project T: 2016–2021 E: 2015–2020	Trainees (Holders) (under training) Companies	45 43 81	Trainees Companies LM	83 38

Source Elaborated by the author based on JICA Project Reports.
Abbreviations T = Tunisia, E = Ethiopia, EKI= Ethiopian Kaizen Institute, TVET = Technical and Vocational Education and Training, LM = Large and Medium Enterprises, MSE = Micro and Small Enterprises, Holders = Qualification Certification Holders
Note This table excludes the number of participants from companies, that is, executive managers, factory managers, and workers involved in *Kaizen* projects

Table 7.3 Tunisia: Numbers of *Kaizen* master trainers (MT) and *Kaizen* advanced trainers (AT) at UGPQP/technical centers/etc

	Second-stage cooperation (AT)	Third-stage cooperation		
		MT	AT	MT + AT
UGPQP		1	0	1
CETIME	5	6	2	8
CETTEX		7	5	12
CTC		4	1	5
CTAA		1	4	5
PACKTEC	2		2	2
CTMCCV		1	3	4
CETIBA			3	3
CNCC			2	2
Sub Total (1)	**7**	**20**	**22**	**42**
MIPME		1	1	2
Private Company		1		1
Sub Total (2)	**0**	**2**	**1**	**3**
Total (1) + (2)	**7**	**22**	**23**	**45**

Source Prepared by the author based on the table in Kikuchi [25]
Notes In addition to the above numbers of qualified trainers, 2 AT Candidates, 41 BT Candidates, 16 staff members of national training centers, and 25 private company staff are participating in training as of February 2020

regarded as one of the organizational capacity of UGPQP. In 2019, UGPQP conducts *Kaizen* training with participation from five French-speaking African countries.

Regarding network capacity, the UGPQ/UGPQP has so far maintained a collaborative relationship with the national technical centers as well as several private associations and universities; but these relationships will be further strengthened with the establishment of the NPPC comprehensive network. Once this network is established, the UGPQP will be required to have the capacity to coordinate and liaise with network members (meaning the capacity to act as a secretariat).

What about the individual, organizational, and network capacities in Ethiopia? The individual capacity is represented by the number of trainees (for the first- to third-stage JICA cooperation) (Table 7.2) and qualification certification holders in the JICA's third-stage cooperation (Table 7.4). These individual capacities consist of part of the capacity of the core organization (EKI).

Let us now examine the organizational capacity of the EKI, which is the core organization for *Kaizen* dissemination in Ethiopia. The capacity to operate the organization itself is affected by the capacity of top management. The first Director General of the EKI exerted his leadership as if responding to the strong leadership of the Prime Minister. He skillfully managed the EKI while securing budgetary appropriation from the government and acquiring the necessary human resources. Along

Table 7.4 Ethiopia: Numbers of *Kaizen*-related qualification and academic degree holders

Qualification/Level	Qualification/Academic degree holders
Advanced-level Consultant (AC)	0
Intermediate-level Consultant (IC)	24 (EKI: 17)
Basic-level Consultant (BC)	23 (EKI: 10)
5S Master	127
5S Leader	161
Kaizen Starter (KS)	60
Trainers for the Senior Management Training Programme (ToT)	5
Master's Degree Holders	66 (EKI: 63)
Those Having Completed the PhD Course	0 (4 attending the course)

Source Prepared by the author based on the Progress Report [12, 13]
Note 1. Figures in the table are as of June 2020;
2. Some individuals hold multiple qualifications/levels

with its increasing manpower strength in terms of both consultants and administrative staff, the EKI has also been attempting to develop and strengthen the managerial capacity of senior staff to gradually enhance the overall capacity of the organization.

In regard to the capacity of the EKI to train and utilize consultants, a system has already been established to continually train consultants capable of providing basic as well as intermediate-level *Kaizen* training and technical support (consultation, guidance, and so on). These trained consultants have been actively utilized to guide younger consultants and to provide training as well as technical services for enterprises. However, the current manpower of the EKI, just like Tunisia, cannot cope with the demand for *Kaizen* from enterprises [13].

EKI, like Tunisia's UGPQP, has accumulated capabilities as a center of excellence that can disseminate *Kaizen* to neighboring countries, based on its experience of *Kaizen* dissemination in its own country over the past 10 years. There are cases where people from neighboring countries come to visit Ethiopia's *Kaizen* successful companies, and there are also cases where EKI consultants go to neighbouring countries to provide *Kaizen* guidance. One such example is EKI's implementation of basic *Kaizen* training in Djibouti in 2019.

Regarding the network capacity in Ethiopia, the EKI has so far established an individual relationship of cooperation with national industrial development institutes (MIDI, LIDI, TIDI, and so on), Regional Kaizen Institutes (RKIs), TVET, and specific universities, but not yet with private sector associations, as UTICA and CONECT in Tunisia have done. In the long run, the role of the private sector is

important for the dissemination of *Kaizen*. In any case, no network with members consisting of organizations (especially, industry, government, and academia) related to the dissemination of *Kaizen* has yet been established in Ethiopia.

The capacities of the individual-level (focusing on the relation between counterparts and foreign expert team) and network-level (focusing on 'industry, government, and academia collaboration system') are further discussed in Sects. 7.4.5 and 7.4.6, respectively.

Regarding organizational capacity, a dynamic perspective is also important, which could include the organizational ability to self-transform. More specifically, it means that core organizations have the ability to transform their own activities and organizations in response to changes in the domestic and international economic and business environment. Singapore offers a good example. The Singaporean government established a productivity agency in the mid-1960s and launched a productivity movement in the early 1980s, with the assistance of Japan (Chap. 4). Even after the assistance from Japan concluded, the government has continued to quickly and flexibly reform its organization and systems in response to changes in the situation and the demands of the industrial sector. This attitude has not weakened even now [39].

7.4 Key Factors Affecting Sustainable Development of *Kaizen*

The previous section compared the 10-year achievements of *Kaizen* Projects in Tunisia and Ethiopia in light of three pillars and analyzed differences and similarities regarding how *Kaizen* Projects were implemented in the two countries. This section focuses on the elements of each pillar which are considered important for the future dissemination and development of *Kaizen* in respective countries and highlights lessons, implications, and challenges. The following six factors are selected for discussion. Factors (i) and (ii) are related to the first pillar, (iii) and (iv) to the second pillar, and (v) and (vi) to the third pillar.

(i) National leaders' commitments;
(ii) Political and administrative stability;
(iii) Organizational structure for dissemination and development of *Kaizen*;
(iv) Counterpart and foreign expert team in customization;
(v) Capacity required for an advanced level of *Kaizen*; and
(vi) Industry-government-academia collaboration and the role of development cooperation.

7.4.1 National Leaders' Commitments

Regarding the first pillar, 'vision, policy, and strategy' reflect the commitment of the national leaders. The relevant policy documents are also concrete manifestations of them.

This can be confirmed by reviewing the 10-year results of JICA-supported *Kaizen* projects in Ethiopia. It was the late Prime Minister Meles Zenawi who enthusiastically introduced *Kaizen* from Japan, confirmed the positive results of *Kaizen* Project himself, and established the Ethiopia Kaizen Institute (EKI) as a core organization for the dissemination of *Kaizen*. The next prime minister Hailemariam Desalegn also took over the commitment of Meles, stipulated the dissemination of *Kaizen* in the national plan GTP II, and established the National Kaizen Council (NKC)[24] to discuss the dissemination of *Kaizen* at the prime minister and ministerial level.

The importance of leader's commitment is also pointed out by Ohno and Mekonen (see Subsect. 4.5.2 in Chap. 4; [30, 33]). They derive six factors from the experiences of successful national productivity movements in Japan and Singapore. The first factor is the national leader's commitments. The Ethiopian case described above is arguably supported by their research.

How, then, is a leader's commitment formed? In the case of Ethiopia, Prime Minister Meles originally had a strong awareness of issues and a deep understanding of *Kaizen*. It is believed that the 'Industrial Policy Dialogue' supported by JICA further strengthened his commitment to *Kaizen* (see Sect. 5.5 in Chap. 5). The case suggests that it is desirable that the implementation of development cooperation projects be accompanied by policy-level support that contributes to the formation of commitments on the part of the recipient country.

7.4.2 Political and Administrative Stability

The other lesson drawn from the comparison of the two countries in the first pillar is that situations which could not be foreseen at the outset and are beyond the control of the project, may occur and have a negative impact on the progress of the project.

In 2008 during JICA's first-stage cooperation, Tunisia launched the *Kaizen* awards scheme targeting those enterprises with prominent *Kaizen* achievements and awarded the First Grand Prix of the President for the Improvement of Quality and Innovation. An annual *Kaizen* Week in March was introduced with the intention of elevating quality and productivity improvement to a national movement. Unfortunately, both of them were abolished following the Jasmine Revolution in 2011 [14, 15]. At the start of JICA's second-stage cooperation (2009–2013), the 'Advisory Committee on Productivity' consisting of knowledgeable persons was in place as a body directly controlled by the President to examine a national strategy for productivity improvement. This committee, too, was abandoned following the Jasmine

[24] See note 12.

Revolution [14]. However, on 24 March, 2021, the NPPC was established with the purpose of promoting productivity improvement throughout the country.

Another lesson learned through the above case is that such political instability has hindered the formulation of visions, policies, and strategies for dissemination of *Kaizen*. If political and administrative instability occurs, is there any way to minimize the impact?

At present, public institutions (UGPQP and EKI) assume a central role in promoting *Kaizen* Projects in both Tunisia and Ethiopia. If the private sector (private associations, private consultants) has developed sufficiently enough to play such a role, it might be able to withstand some unexpected changes in politics and public administration. Therefore, in the long run, the government should create an environment for the private sector (private associations including consulting association) to more positively participate in learning and disseminating *Kaizen*. The private sector should also make enhanced efforts in this endeavor, rather than relying on the government.

7.4.3 Organizational Structure for Kaizen *Dissemination and Development*

The organizational structure to receive JICA cooperation differs between Tunisia and Ethiopia. More specifically, Tunisia has adopted the 'collaborative type' structure, compared to the 'independent type' adopted in Ethiopia. In Tunisia, the UGPQ/UGPQP as a core organization for *Kaizen* learning and dissemination has been a time-bound organization since its establishment in 2005, and there has been a collaborative system of the UGPQ/UGPQP with the national technical centers. On the other hand, the EKI in Ethiopia was established in 2011 after JICA's first-stage cooperation and has been the core organization receiving the JICA cooperation.

It is difficult to evaluate which approach is better. This is because the industrial climate, corporate culture, and some other conditions of the two countries are different. Looking back on the achievements of the *Kaizen* Projects in both countries over the last decade, each type has its own unique achievements in each country. However, there is no guarantee that each type of organizational structure that has worked effectively in both countries will remain valid in the future.

At the same time, in both countries, the core organization is a public institution at present. There is a question of how much public institutions should intervene in *Kaizen* activities in which many private companies are involved. From a national point of view, how to form the organizational structure is also an issue related to the basic policy of the administrative organization of the country. Therefore, it may not be realistic to discuss the organizational structure only taking into consideration the industrial climate and corporate culture of the country. Considering these matters, what type of organizational structure is appropriate for the future is an extremely challenging issue for both countries.

If JICA supports the establishment of organizational structure for *Kaizen* dissemination, the most important thing is to recognize the differences in domestic conditions of each country and take appropriate cooperation policies, with good understanding of the importance of local adaptation on the receiving side [39].

7.4.4 Counterpart and Foreign Expert Teams in Customization

This section discusses the future challenges for counterpart and foreign *Kaizen* expert teams in relation to 'customization' and 'translative adaptation.'

A crucially important condition for successful customization is that the technology to be transferred is well-adapted to the industrial climate, corporate culture, and local conditions of the recipient country. Accordingly, two sides—the recipient of technology (the counterpart) and the party transferring the technology to the counterpart (the foreign expert team)—must have a deep understanding of the essence of the technology[25] and the circumstances of the country to which the technology is being transferred.

However, it is unlikely that both sides will be in such a state from the beginning. Usually, at the beginning of technology transfer (or in the first stage of a project), the counterpart may not have sufficient knowledge or information about the technology or may not have it at all. On the other hand, the foreign expert team may not have enough knowledge and information about the industrial climate, corporate culture, and local conditions of the recipient country. However, as the project progresses, the counterpart who receives the training deepens their understanding of the technology, while the foreign expert team improves its understanding of the circumstances of the country.

Therefore, while the counterpart should take the initiative in customizing transferred technology, the foreign *Kaizen* expert team should also endeavor to propose ideas related to 'customization' or 'translative adaptation' when the counterpart does not. It is often said that, 'Even if you seem to know yourself well, sometimes you may not be aware of it by yourself.' Regarding 'customization,' it seems that even if the counterpart is familiar with the industrial climate of their own country or their own corporate culture, it is apparent that there are aspects of the cultural climate that insiders may not be aware of.

From the viewpoint of sustainability and ownership, the independence ('*syutaisei*'[26]) of 'customization' should be the side to whom the technology is transferred, or the counterpart. However, since the foreign expert team can gain a deeper

[25] Wada [38] emphasizes the importance of understanding the essence of the technology to be transferred, taking the experience of Japan's Meiji Restoration and Japan's economic development after the World War II as examples.

[26] '*Syutaisei*' is a Japanese term used in this chapter to mean having a strong will to do something and being responsible for the result.

understanding of the industrial climate, corporate culture, and local conditions of the counterpart side as the project progresses, the foreign expert team will be able to provide the counterpart with suggestions for 'customization.'

When implementing a project, the foreign expert team will generally make their best effort to explain to counterparts as quickly as possible the essence of *Kaizen* technology and how to implement it smoothly. However, considering the above points, the foreign expert team should proceed with the transfer of the technology together with their counterparts on the premise of 'customization' from the beginning of the project. Therefore, the foreign expert team should not only transfer *Kaizen* technology, but also contribute to the provision of 'customization' ideas and the formation of capacity and *syutaisei*[27] for the 'customization' by counterparts. How to materialize this is a challenge given to future counterparts as well as foreign expert teams.

It is important for technology recipients (counterparts) and technology providers (foreign expert teams) to have social and cultural perspectives rather than simply working from a technical perspective. To that end, it is worth considering adding a cultural anthropologist or similar expert to the project team.

7.4.5 Capacity Required for Advanced-Level of Kaizen

One prominent achievement of JICA cooperation related to *Kaizen* in Tunisia and Ethiopia in the last 10 years is that both countries have mastered basic as well as intermediate (and partially advanced) level *Kaizen.* In addition, a system for developing such human resources has also been established in each country. The future challenge for them is how to achieve the learning and dissemination of advanced-level *Kaizen* while making continuous efforts to further disseminate and firmly establish the *Kaizen* they have mastered so far. This section deals with the individual capacity for advanced-level *Kaizen*.

Competition between enterprises in the international market is likely to grow rather than decrease in the coming years. It will be particularly necessary for Tunisia to strengthen its market competitiveness in terms of not only price but also quality, to meet the demands of the European Union (EU) countries that have been the main export destinations for Tunisian products for many years. What are the required capacity and conditions to master and disseminate the necessary more advanced *Kaizen* in the coming years? In general, the introduction of basic *Kaizen* to an enterprise does not require much technical knowledge of machinery and systems (inherent technologies) compared to the introduction of advanced technologies. Meanwhile, knowledge and experience of inherent technologies are necessary to master advanced *Kaizen* [12, 35]. In this context, technical staff of the national technical centers in

[27] Hashimoto [6] and Umetani [36] state that the success of Japan's modernization and industrial development in the Meiji Restoration were achievements resulting from the Meiji government leaders having a strong '*syutaisei*' (independence) and formulating modernization policies on their own. The leaders did not give '*oyatoi gaikokuzin* (hired foreign advisors)' any room to claim [6, p. 41].

Tunisia have acquired knowledge and experience through their essential work in providing technical services to enterprises.

In Ethiopia, many consultants of the EKI are the graduates of an engineering course and were employed by the EKI immediately after graduation. Thus, even though they have subsequently built up their experience of applying basic *Kaizen* to the production floors of enterprises, they lack sufficient practical knowledge and experience regarding manufacturing as well as operating technologies involving machinery.

During the training on intermediate-level *Kaizen* theories (CRT) in the third stage of cooperation, the trainees (EKI consultants) made study visits to industrial development institutes (MIDI, TIDI, and LIDI) to strengthen their knowledge of inherent technologies in addition to having classroom lectures on such technologies. Nevertheless, their practical experience regarding inherent technologies on actual production floors is limited [13]. Accordingly, for EKI consultants aspiring to learn advanced-level *Kaizen*, how they acquire practical knowledge of inherent technologies will be an unavoidable issue in the coming years.

This narrative suggests that the participation of national technical centers throughout the three stages of JICA cooperation in collaboration with the UGPQ/UGPQP in Tunisia has been very advantageous. The consultants at the UGPQP and national technical centers have another advantage compared to the Ethiopian consultants. Basic *Kaizen* generally addresses issues on the production floor. With the advancement of these technologies to the intermediate-level and further to the advanced-level, the relationship between *Kaizen* consultants and management deepens, and knowledge of business management becomes necessary. Those consultants currently working at the national technical centers in Tunisia have already acquired knowledge of business management to some degree.

The technical staff of the UGPQ/UGPQP and eight national technical centers in Tunisia have acquired their knowledge of business management through international cooperation from the EU, which has provided guidance since 2005 so that Tunisian enterprises can receive certification under the ISO 9000 series of international management standards.[28] The ISO 9000 series of standards aims at promoting the quality management of enterprises, and these Tunisian consultants do have knowledge of business management within the scope of such standards. Based on this, it can be said that the Tunisian consultants who have acquired some of the advanced-level *Kaizen* in addition to basic and intermediate-level technologies with the cooperation of JICA are in a better position to master advanced technologies than the Ethiopian consultants.

In Ethiopia, while EKI consultants have acquired some knowledge and experience of inherent technologies through practical work at enterprises and study visits to national industrial development institutes during the third-stage cooperation period (2015–2020), their knowledge and experience are not always sufficient. In regard

[28] With EU assistance, the UGPQ aimed at certifying 600 Tunisian enterprises by 2010; 1,300 enterprises ultimately to have capacity equivalent to that required under ISO (International Organization for Standardization) and other international standards [10, 15].

to knowledge of the ISO 9000 series, EKI consultants study quality management during the CRT, but their training does not extend to providing practical guidance for enterprises based on the ISO 9000 series.

During JICA's third-stage cooperation, EKI consultants provided training on basic *Kaizen* for technical staff of industrial development institutes. However, these staff still lack sufficient experience required to provide guidance for enterprises on their own even though national industrial development institutes in Ethiopia are corresponding organizations to the national technical centers in Tunisia. The major challenges faced by Ethiopia regarding the learning of advanced *Kaizen* in the coming years are: (i) how to overcome the insufficient knowledge and experience of inherent technologies among EKI consultants; (ii) how to make technical staff of industrial development institutes learn *Kaizen* in earnest; and (iii) how to develop further collaboration between the EKI and industrial development institutes.

Regarding challenge (iii), it is not easy in reality to develop collaboration between the EKI and industrial development institutes. Each industrial development institute has its own essential work (especially fee-charging services for the private sector), and its technical staff prioritize such services. This means that there should be a higher-level function to coordinate the work of the EKI and industrial development institutes.[29]

7.4.6 Industry-Government-Academia Collaboration and the Role of Development Cooperation

In terms of learning, modifying or customizing, and disseminating *Kaizen*, there is a limit to the capacity of the core organization alone. It is crucial for the core organization to form collaborative relationships with related organizations. Looking at activities in Ethiopia and Tunisia to disseminate *Kaizen* over the past 10 years, collaboration across industry, government, and academia has been critical.

When looking back at JICA's technical cooperation for the *Kaizen* Project in Ethiopia over the period of 10 years, it can be confirmed that this development cooperation has taken the roles of industry, government, and academia into consideration. JICA's cooperation for the *Kaizen* Project, 'Policy Dialogue on the Industrial Development of Ethiopia,' and the establishment of master's degree and PhD courses corresponds to the levels of industry, policy (government), and university (academia) respectively. Both the Policy Dialogue on the Industrial Development of Ethiopia and the *Kaizen* Project (first-stage cooperation) were assisted by JICA and simultaneously commenced in 2009. Furthermore, the *Kaizen* Project was promoted to the level of a national development plan through industrial policy dialogue [31]. Assistance for the establishment of master's degree and PhD courses was not part of the

[29] In 2022, EKI and national industrial institutes are supervised by the newly established Manufacturing Industry Development Institute under the Ministry of Industry. High-level coordination among them is expected for this new institute [4].

original concept of the first-stage *Kaizen* Project; but, with a strong request made by the Ethiopian side, a master's degree course was added to the second-stage *Kaizen* Project. The PhD course was then introduced during the third-stage cooperation period.

How about the development of private associations in Ethiopia? As already mentioned, such private associations (like UTICA and CONECT in Tunisia), have not developed. In Ethiopia, the collaboration between EKI and private associations ('industry') remains weak, and there may be a long path to forming a core network across industry, government, and academia.

In contrast, over the last 10 years of JICA cooperation in Tunisia, a collaborative relationship has been created between UGPQ/UGPQP and leading industrial organizations (UTICA, CONECT) during the process of project implementation. At the university level, the JICA expert team and UGPQP conducted seminars for some universities, for instance, seminars for teachers and students not only with universities in Tunis, the capital, but also in local universities to develop a collaborative relationship with those universities. At the policy level the JICA expert team and counterpart team made joint recommendations for the Annual Performance Plan (APP) of the Ministry of Industry. As a result, productivity improvement in addition to quality improvement came to be recognized as an important pillar of Tunisia's industrial policy after 2019. However, Tunisia has no equivalent to the Ethiopia-Japan industrial policy dialogue.

Either way, the process of attempting to compare the achievements of the *Kaizen* Projects in Tunisia and Ethiopia reminds us of the experience of Japan and reconfirms the importance of industry-government-academic collaboration. This line of thought is strengthened by a study by the Massachusetts Institute of Technology (MIT). In the second half of the 1980s, MIT published a book (*Made in America: Regaining the Productive Edge*) which compiled the findings of a two-year study aimed at restoring American industries. This study involved interviews with senior members of some 200 enterprises plus labor unions, etc. in the US, Japan, and Europe. The subsequent policy recommendation based on detailed data produced by the study contains the following sentence:

> …for the United States to succeed in building and sustaining an economy with high productivity growth, all sectors—business, government, labor[30] and educational institutions—will have to work cooperatively toward this goal. [1, pp. 131–132]

It is particularly important for the formation of a network for the dissemination of *Kaizen* to first of all consider the creation of an industry-government-academia collaboration system, which may be called 'a core network' in 'a comprehensive network.' Within this network, industry has the ability to implement approaches, the government has the ability to formulate policies, and the academia has the ability to educate and research. This collaboration creates the network ability to learn, modify

[30] In this policy recommendation, emphasis is placed on cooperation with labor unions. The participation of labor unions was important in the post-war productivity movement in Japan [20] and also in the similar movement in Singapore where labor unions were cooperative [32]. The labor union in Tunisia is a member of the NPPC.

or customize, and disseminate *Kaizen,* exceeding the ability of the core organization. One of the implications from JICA's 10-year *Kaizen* Projects in Tunisia and Ethiopia is that the development cooperation for *Kaizen* dissemination should lead to the formation of the core network of industrial, governmental, and academic organizations.

7.5 Conclusion

This chapter has identified three pillars as a framework to compare and analyze the 10-year achievements of JICA-supported *Kaizen* Projects in Tunisia and Ethiopia, clarifying their differences, similarities, and characteristics. The final section summarizes the future of three pillars for each country and draws implications for development cooperation.

During the 10-years of the *Kaizen* Project in Tunisia, it is presumed that the national industrial policy makers have deepened their awareness of *Kaizen* methods and ways of thinking as effective for promoting industrial development and strengthening industrial competitiveness. The NPPC, which was established in March 2021, the last year of the third-stage of JICA supported *Kaizen* Project, is considered to have been born under such a background. The main activity of NPPC is policy formulation related to quality and productivity improvement. With the birth of the NPPC, it is expected that the first pillar, which consists of 'vision, policy, and strategy' for future dissemination of *Kaizen*, will be maintained.

As for the second pillar, during the 10-year project period, several 'mechanisms, organizations, and systems' for dissemination of *Kaizen* were established in Tunisia. First, a collaborative system was built between UGPQP and eight national technical centers, and the *Kaizen* Project was promoted and implemented through this system. In addition, over the past decade, the collaborative system has developed a *Kaizen* trainers training (ToT) program, certification system, mechanisms for providing *Kaizen* training and technical services to enterprises, an award scheme, and collaborative relationships with private associations (UTICA and CONECT) and universities. So, it can be said that the foundation for the third pillar of the future has been laid, though the nature of the counterpart organization should not be overlooked. Expectations for *Kaizen* dissemination from the public and private sectors for the UGPQP may increase in the future. The issue remains whether the UGPQP should remain as a time-bound organization, or whether it should become a permanent organization. This is also a question of future organizational capacity.

Regarding the capacity in the third pillar, *Kaizen* trainers with basic and intermediate level (and some who have reached the advanced level) capacity have been developed in the last decade. However, the number of trainees is not enough to meet domestic needs, and there remains the issue of developing and accumulating individual capacity in terms of quantity and qualifications, including the training of advanced-level trainers. Expectations for expanding the UQPQP's capacity as a core organization for *Kaizen* dissemination will grow in the future. So, expanding

capacity is another issue along with the above-mentioned organizational nature. In terms of the network capacity, as mentioned in Sect. 7.4, formation of an industry-government-academia network centered on UGPQP is not so difficult a task.

The JICA supported *Kaizen* Project in Ethiopia began with a strong request from the Prime Minister of Ethiopia at that time, and EKI (now KEC) was established as a core organization for *Kaizen* dissemination in 2011. Even after the Prime Minister changed, *Kaizen* was positioned as an important tool for industrial promotion in the country's national development plan. Furthermore, the National Kaizen Council (NKC), chaired by the prime minister, was established in 2013. Therefore, the first pillar to form 'vision, policy, and strategy' is expected to be maintained even if the administration changes, since the effectiveness of *Kaizen* is already widely recognized not only in the industrial sector but also in hospitals, schools, and local governments. Expectations for *Kaizen* are also stated in the recent policy document "*Ethiopia Tamirt: A National Movement to Build a Manufacturing Ethiopia through an Integrated and Sustainable Approach*" announced by the Ethiopian Ministry of Industry (March 2022).[31]

Many of the 'mechanisms, organizations, and systems' that make up the second pillar have been established in the last decade and are in still the process of development. EKI (currently KEC) has established an organization and management system and has been developing both in terms of activities and personnel. In addition, like Tunisia, Ethiopia has also developed and established a *Kaizen* human resource development program, certification and registration system (CARS), mechanisms for providing training and technical services related to *Kaizen* to companies, award scheme, and collaborative relationships with universities through the establishment of *Kaizen* Master and PhD courses. However, at present, there are no private associations that EKI can cooperate with. Considering sustainable *Kaizen* dissemination, the role of private associations is important and how to develop and strengthen private associations will be an important issue for Ethiopia in the future.

Regarding the third pillar, 'capacity' development and accumulation, during the 10 years of JICA's cooperation, human resources at the basic and intermediate levels of *Kaizen* have been developed, and qualified personnel have also been trained. However, there is a shortage of consultants with the capacity to deal with such technical services for enterprises or the development of advanced-level human resources, for which there is a growing need. This is another issue for the future. It can be said that EKI's capacity as a core organization for *Kaizen* dissemination has been steadily developed and accumulated not only in the consulting department but also in the management department. As for network capacity, the first priority should be given to building a system of collaboration among industry, government, and academia. However, it seems that the formation of such a network is difficult at this stage due to underdeveloped private associations.

[31] '*Kaizen* implementation scale-up and creating model *Kaizen* Company's initiative' is suggested to be implemented in the first phase of the *National Movement* [28].

Based on the above, one of the issues to be addressed in Ethiopia in relation to the three pillars is how to develop private associations and private consultants. This is because, from a long-term perspective, the private sector should play an important role in disseminating methods and way of thinking such as *Kaizen* for enterprises. This idea also applies to Tunisia.

Finally, development cooperation should be mindful of the three pillars. It is important for all three pillars to be in place for the sustainable development of *Kaizen*. Based on the achievements of the *Kaizen* Projects in both Tunisia and Ethiopia over the past decade, this idea is more or less plausible, even if the three pillars have not been yet fully in place in the two countries. Therefore, the development cooperation that supports the *Kaizen* Projects should, from the very beginning, work together with recipient countries to draw up a picture of their own three pillars for each country and provide guidelines for their realization.

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Chapter 8
Thailand's Experience of Learning Industrial Technologies and *Monodzukuri* Education with Localization

Izumi Ohno and Junichi Mori

8.1 Introduction

This chapter analyzes Thailand's experience with technology promotion and technical education by learning and localizing Japanese-style manufacturing (*monodzukuri*[1]), through two case studies of the Technology Promotion Association (Thailand-Japan) (TPA) and the Thai-Nichi Institute of Technology (TNI). Japan and Thailand have a long history of business partnerships, economic cooperation, and official development assistance (ODA). Japan is the largest investor in Thailand, and many Japanese companies, especially in manufacturing, have established their factories in the country.[2] Thailand was one of the largest recipients of Japanese ODA

[1] *Monodzukuri* is the Japanese term for manufacturing. It literally means 'making of things' in Japanese. While it is often spelled as *monozukuri* in English, this chapter uses *monodzukuri,* following the usage by the Japanese Ministry of Economy, Trade and Industry (METI), which TPA and TNI also adopt.

[2] Thailand ranked third in the number of overseas sites of Japanese companies after the United States and China [12]. The Japanese Chamber of Commerce, Bangkok (JCC), established in 1954, has 1,651 member companies in 2022 and is one of the largest overseas Japanese chambers of commerce in the world.

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in the 1980s and 1990s until it reached the stage of an upper-middle income country.[3] Thanks to such long-standing partnerships and accumulated assets, in Thailand there is a thick layer of industrial human resources familiar with Japanese value and skills. Furthermore, notable initiatives have emerged from those people who were strongly committed to the industrial development of Thailand. They created local organizations to promote technology transfer from Japan, while building extensive networks with the government, the private sector, and academia in both countries.

TPA and TNI are two brilliant examples of such initiatives. TPA is a non-profit organization (NPO) established in 1973 by Thai alumni who graduated from Japanese engineering universities and ex-trainees of the Association for Overseas Technical Scholarships (AOTS, currently renamed the Association for Overseas Technical Cooperation and Sustainable Partnerships)[4] with a strong commitment to strengthening economic and industrial ties between Thailand and Japan. After returning home, they established TPA to be a center for promoting learning and disseminating new industrial technology from Japan for Thai people and enterprises. TPA offers various industry-related services such as training, calibration, enterprise diagnosis, and consulting, as well as language courses and publication. TNI was established by TPA in 2007 as a 'Japanese-style *monodzukuri* university' for Thai people by Thai people. It offers field-oriented and practical education to foster engineers and core human resources for manufacturing and other industries. As such, TNI is designed to share TPA's experiences not only with industrial circles but also with young generations and academic groups. Both TPA and TNI consider '*monodzukuri* human resource development' to be a central theme of their activities.

How have TPA and TNI learned industrial technologies from Japan and developed localized mechanisms for promoting technical education and training for Thai people and enterprises? What are the key factors contributing to their success? How are they embarking on new challenges of technology learning and promotion in the era of digitalization, while taking advantage of Thailand's position as a manufacturing hub in Southeast Asia where regional economic integration is advancing?

This chapter aims to answer these questions through in-depth case studies of TPA and TNI. The chapter is organized as follows. Following the introduction, Sects. 8.2–8.3 review the history of the establishment and development of TPA and TNI. Section 8.4 explains the recent efforts of TPA and TNI to address new opportunities and challenges under the changing landscape of industrialization. Section 8.5

[3] Thailand's GDP per capita is 7,233.4 USD in 2021 (World Bank data).

[4] AOTS was established in 1959 and named The Association of Overseas Technical Scholarship, as an expert training organization for industrial human resource development in developing countries; The Japan Overseas Development Corporation (JODC) was established in 1970 as an expert dispatch organization. The two organizations operated under the jurisdiction of then the Ministry of International Trade and Industry (MITI) and were merged in 2012 under the English name The Overseas Human Resource and Industrial Development Association (HIDA). In 2013, HIDA became a general incorporated foundation, and in 2017, was renamed as the Association for Overseas Technical Cooperation and Sustainable Partnerships (AOTS).

discusses the process of their local learning and step-by-step development of organizational capacities and analyzes key factors contributing to their success through operational sustainability. Section 8.6 summarizes the findings and draws their implications for other developing countries.

8.2 TPA: 50-Years' Efforts Toward Learning and Promoting Industrial Technologies in Thailand

8.2.1 Origin and Background

The establishment of the Technology Promotion Association (Thailand-Japan) (TPA) dates back to the 1970s when the anti-Japanese movement was growing in Southeast Asia, triggered by the expansion of Japanese companies into Southeast Asia. The Japanese government decided to take measures to mitigate economic friction between Japan and Thailand, and based on discussions with the private sector, the Ministry of International Trade and Industry (MITI, currently the Ministry of Economy, Trade and Industry: METI) formulated the concept of private sector-based economic cooperation for Thailand that differed from the prevailing economic cooperation focused on the promotion of exports by Japanese companies. MITI then asked Goichi Hozumi, President of the Asian Students Cultural Association (ACSA) and AOTS, to visit Thailand to firm up how to build close friendship between Thailand and Japan through economic cooperation. Hozumi listened to the opinions of Thai alumni members and local industrial circles and the wishes of Thai people. The Thai representative was Sommai Hoontrakul, former Finance Minister of the Thai government, who also studied in Japan. Based on the discussions, Hozumi made concrete suggestions to MITI, which emphasize the importance of human resource development for the real benefit of Thailand.

Considering Hozumi's suggestions, MITI and the Japanese industrial circle agreed on the following:

1. An organization (=JTECS) shall be established in Japan with contributions of the private circles under the coordination of the Japan-Thailand Trade & Economic Committee of Keidanren (Japan Federation of Economic Organizations), and the subsidy of Japanese government may be expected.
2. The Japanese-side may support financially through JTECS, at the earlier stages, the activities of a private association in Thailand (=TPA) until it becomes a self-supporting organization in the future. All the policy-making and administration shall be managed by the Thai people.
3. The communication channels of both sides, Japan and Thailand, shall be unified to JTECS=TPA in order to avoid any confusion.

[6, p. 8]

In 1972, the Japan-Thailand Economic Cooperation Association Society (JTECS) was established in Tokyo as the parent organization on the Japanese side as a public-interest corporation under the jurisdiction of MITI/METI.[5] It aims to promote friendship between Japan and Thailand through projects for technology transfer and human resource development, thereby contributing to industrial development in Thailand. Hozumi became President of JTECS. Subsequently, TPA was established in 1973 in Bangkok on the Thai side as a non-profit, public interest organization, to implement this new cooperation framework. Sommai Hoontrakul became the first President of TPA.

Hozumi is a socially minded educator who dedicated his life to the progress of developing countries by receiving foreign students and trainees to Japan, based on his reflection on Japan's World War II experience. He adhered to the principles of: (i) equal partnership (respecting the ownership of partners); and (ii) building 'face-to-face' relationships based on trust. Many Thai alumni stayed at the ACSA-managed dormitory, Asia Bunka Kaikan (ABK), as international students, and were exposed directly to this 'Hozumi spirit.' They became the founders of TPA.

8.2.2 Philosophy and New Cooperation Framework

TPA embraces the philosophy of 'disseminating knowledge, building economic base' to promote the growth and advancement of the Thai economy and industry. It has a clearly defined mission to serve as 'a bridge of technology dissemination on management and engineering from Japan to the Thai personnel widely' [6, p. 6].

The founders of TPA, who experienced studying in Japan, were deeply concerned about the worsening popular sentiment towards Japan following economic friction in the 1970s. At the same time, they were convinced of the importance of learning the latest knowledge from Japan and promoting technology transfer to Thailand. JTECS has assumed a facilitating role in this endeavor by securing financial support from the Japanese government, raising funds from private companies through membership fees, gathering information on the trends of Japanese businesses, commissioning training programs to TPA, and dispatching experts to TPA.

Figure 8.1 shows the relationship between JTECS and TPA. Here, it is important to note the partnership principles of TPA-JTECS under this new cooperation framework, which include: (i) full respect for ownership of the Thai side; (ii) economic cooperation based on public–private partnership; and (iii) aid for graduation. The Japanese side will fully respect the ownership of TPA's decision-making and management and will not interfere. Technology transfer will be implemented through private-sector channels. While the Japanese government will provide financial support through

[5] As part of the Japanese government's administrative reforms launched in 2008, which mandated that existing public interest corporations be transformed into new corporation within five years, JTECS became an incorporated association in 2013, and the government's support was discontinued. Since then, JTECS has been financed through membership fees of companies and motorcycle race subsidies (based on the author's interviews with ABK and JTECS in July 2013).

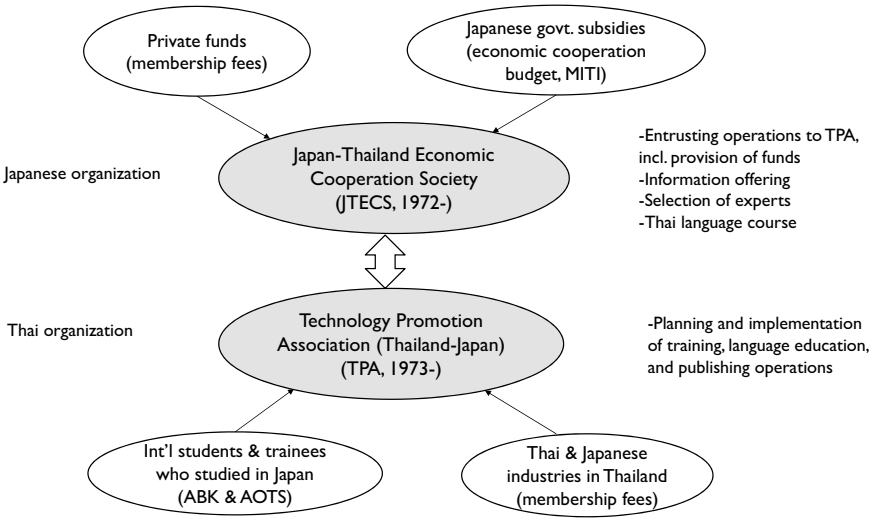

Fig. 8.1 Relationship between JTECS and TPA (*Source* Compiled by the author based on JTECS information)

JTECS, TPA is expected to graduate from aid once it becomes a self-supporting organization.

8.2.3 Activities of TPA

Over the past 50 years, TPA has continuously introduced new technologies from overseas to the Thai industrial sector and has increasingly gained wide recognition from the Thai public. Now, its activities cover various fields instrumental to the development of the Thai economy and industry.

The main activities of TPA are: (i) language education in Japanese, Thai, English, and other languages (including textbook publication); (ii) publication and translation of books related to technology and management; (iii) education and training programs related to business management and technology; (iv) industrial, medical, and laboratory instruments calibration services; and (v) enterprise diagnosis and consultancy businesses. While language education aims at wider beneficiaries, the other activities are primarily for companies and/or their managers and employees.

During the initial phase, TPA heavily relied on funding from the Japanese government, channeled through JTECS. By adding new services one by one, TPA gradually increased its own revenues and achieved a self-financing rate of 100 percent by 2009 (see Table 8.1). It should be noted that from the very outset of its foundation in 1973, TPA's core members set a future goal of establishing a technical university. They were keenly aware of the need to create revenue-generating activities because TPA

membership fees, which were spent primarily for preparation and distribution of its newsletters to its member companies, would not be sufficient to achieve its goal. Accordingly, they decided to take a step-by-step approach, starting with a service that had relatively clear market needs and a high degree of certainty.

Generally, it is not easy for a donor-funded project in the field of technical and vocational education and training (TVET) to achieve effectiveness and sustainability. This is mainly because considerable knowledge and efforts are required to continue

Table 8.1 Key events surrounding TPA and increase in own fund

Year	Key events	Self-financing ratio
1972	JTECS established in Japan	
1973	TPA established in Thailand	0%
	Technology & management seminars, Japanese language courses, and translation & publication of technical books started in Bangkok (U Chu Liang building)	
1974	Thai language course started	
1975	TPA's own building was built in Bangkok (Sukhumvit), where the headquarters was transferred	
1977	Training for industrial measurement technology started	
	SME survey & guidance operation started (e.g., publication of technical books in Thai)	
1979	JTECS started Practical Thai Language Course in Japan	
1985	TPA headquarters annex opened	25%
1986	Operation to receive industrial technology hands-on training delegations started (e.g., energy-saving)	
1987		50%
1989	Operation to promote industrial producer education (distance training) started	
1993	Operation to organize a robot contest in Thailand started	
1994	SME manager development course started	
1995	Regional promotion training operation started	
1996	Construction of Technology Promotion Institute (TPI) started	
1998	TPI opened in Pattanakarn, Bangkok	75%
1999	Training program for SME enterprise/factory evaluators started, commissioned by the Thai govt	
2001	School of language and Culture TPA opened in Rangsit	
2002	The first Thailand 5S Award organized	
2006	Construction of TNI started	
2007	TNI opened	
2009		100%

Source Elaborated by the author, based on JTECS et al. [6] and Mori [10]

providing training programs in a way that properly meets the needs of companies and society, and the facilities and equipment are very expensive. It is also because the results of human resource development projects are hard to measure due to their long gestation period and diverse spillover-effects. Despite all these challenges, TPA grew solidly and by 2007, came to possess two bases in Bangkok (the headquarters and the TPA Technology Promotion Institute: TPI) and a branch school in Rangsit that mainly provides language education.

8.2.3.1 School of Language and Culture

With a wide range of target participants, language education is an area that TPA has been working hard on from the beginning. TPA started with a Japanese course (for Thai people) and a Thai course (for Japanese) in 1973 and 1974, respectively.[6] The number of participants was initially 497 (in 1973) and grew steadily to reach over 1,000 by the early 1980s. During 1973–2021, TPA offered 25,206 courses in Japanese, Thai, English, Chinese, and other languages for 310,144 participants [17].

TPA particularly has strengths in Japanese language education. To avoid excessive competition and ensure complementarity, it deliberately took a strategy to coexist with private Japanese language schools. TPA endeavored to elevate the overall level of Japanese language learning, by organizing workshops for Japanese language teachers and Japanese speech contests [3]. In 2009, TPA was certified by the Ministry of Education as a private educational institution with 'Excellent Internal Quality Assurance Accredited.' In 2018, TPA developed professional standards and certification examinations for Thai language education, translation, and interpretation for foreigners, entrusted by the Thailand Professional Qualifications Institute (TPQI) under the Prime Minister's Office.

8.2.3.2 Publishing and Translation

When TPA was established, there were few technical books written in the Thai language. To study industrial technology, students, engineers, and business people had to use original English editions. Moreover, few technical books published in Japanese had been translated into Thai, either. Because the number of people capable of reading the original books was limited, it took a long time for Thai people to absorb the foreign technology. TPA has therefore translated many English and Japanese technology books into Thai. TPA also publishes a monthly information magazine, 'Creative & Idea KAIZEN,' which introduces *Kaizen* activities in Japanese manufacturing and service industries with concrete examples. Additionally, TPA publishes various kinds of books such as language textbooks, teaching materials, and Japanese

[6] JTECS also initiated a practical Thai language course in Japan in 1979. While TPA is particularly strong in Thai and Japanese language courses, it now offers English, Chinese, and Korean language courses for Thai people as well.

culture books. In fact, it boasts the largest number of publications in Thailand in the area of Japanese-language teaching materials. Currently, TPA annually publishes 30–40 books. During 1973–2022, 1,297 new books were published, and 10,918,030 copies were printed [17].

8.2.3.3 Technical and Management Training

TPA offers various types of seminars and training courses by flexibly responding to the needs of markets or specific companies in terms of subjects, size, and periods. These include public trainings (regular training courses), in-house trainings, and distance learning programs in collaboration with SANNO University in Japan.

In 1985, the annex of TPA headquarters was opened, which enabled TPA to increase the number of training participants and expand its activities. The opening of TPI in 1998 in Pattanakarn allowed for further expansion of training activities, with the installation of new facilities and equipment to conduct training programs in various fields, such as automatic controls, CNC (computer numerical control), CAD (computer aided design)/CAM (computer aided manufacturing), and mechatronics. In 1999, its training department obtained ISO 9001 certification and has been conducting seminars and training in more than 20 fields, such as business management, marketing, human resource management, production management, energy, measuring instruments, computers, and logistics. During 1973–2022, TPA offered 27,035 courses, in collaboration with various instructors from the public and private sectors, with the number of participants reaching 1,390,406 [17].

Table 8.2 shows the main training courses related to business management, which are currently offered throughout the year. It is worth noting that the themes of recent training courses include digital technologies, AI (artificial intelligence), IoT (Internet of Things), and automated production. These courses are primarily targeted to Thai people. Separately, TPA runs training courses for Japanese executives in such areas of the rules and regulations on imports/exports, labor, safety, environment, etc. (15 courses) and Japan–Thailand cross culture understanding seminars (4 courses).

In addition to seminars and training courses, TPA organizes lectures by Japanese experts, factory visits, and study tours to Japan. It also hosts awards every year, including Thailand Quality Prize (QC circle) (1983), Thailand 5S Award (from 2002), Thailand Kaizen Award (from 2006), Kano Quality Award (2009), and Thailand Lean Award (from 2009). Moreover, TPA introduced the first ever robot contests to Thailand, with a focus on contests for university and high school students. These include annual TPA Robot Contest Thailand Championship (from 1993), the TPA Robot Junior (from 2001), and the PLC (Programmable Controller Competition) (from 2006). Robot contests aim to strengthen the creativity and skills of the young people responsible for the development of Thailand and to increase general public interest in technology.

Table 8.2 TPA training program (2022–2023)

① Administration and Management (179 courses) e.g., • Kaizen for Production (Practice) • Time Management for Effective Work • Procurement Role in Cost Savings	④ Energy Environment and Safety (51 courses) e.g., • Water Treatment and Management in Industry • Safety Officer for Management Level • Industrial Waste Management for Supervisor	⑧ Quality Promotion and Standardization (86 courses) e.g., • Voice of Customer for Quality • MSA: Measurement System Analysis • QC 7 Tools for Maintenance: Practice
② Applied Computer (23 courses) e.g., • How to Use QC 7 Tools in Excel for Quality Control • Infographic & Interactive Presentation by PowerPoint 2016 • Robotic Process Automation by VBA	⑤ Instrumentation (64 courses) e.g., • Measurement Decision Risk according to ISO/IEC 17025: 2017 • Process Instruments Calibration & Troubleshooting • Metrological Principle of Equipment Verification for Industry	⑨ Master Certification Program (20 courses) e.g., • Lean Master Certification Program • Six Sigma Black Belt Certification Program • 5S for Executive
③ Digital Technology, AI and IoT (4 courses) e.g., • For Logistics and Transportation, IoT Logistics • Using IoT to Create a Smart Logistics Platform • Grow through Industry 4.0—Connected Industry	⑥ Manufacturing Management (79 courses) e.g., • Cost Volume and Profit Analysis • Change Control by 4 M (Man, Machine, Method, Material) • Supply Chain Management	⑩ Factory Automation (14 courses) e.g., • Automation and Karakuri Kaizen • Automation for Maintenance Management • Basics of Fuzzy Logic Control
	⑦ Maintenance Management Skills (75 courses) e.g., • 5S Audit Technique • Electrical Control System & Motor Maintenance for Technician • Safety Maintenance: Practice	

Source Compiled by the author, based on TPA [21]

8.2.3.4 Industrial, Medical, and Laboratory Instrument Calibration Services

TPA initiated calibration services in 1977 as a fourth main business, following language courses, publishing businesses, and training. In those days, there were few places in Thailand that provided calibration services for measuring instruments. So,

this business significantly improved the capabilities of Japanese and Thai companies and enhanced TPA's ability to generate its own revenue. TPA offers various types of testing and calibration services to measure temperature, humidity, pressure, weight, length, etc. These include: (i) calibration services for industrial measuring instruments; (ii) calibration services for medical and laboratory measuring instruments; (iii) on-site calibration services; and (iv) measuring instruments of secondary standard level. TPA also operates an environment testing center.

As mentioned above, the opening of TPA-affiliated TPI in 1998 led to increased demand for calibration services, and TPA expanded its operations by adding on-site services. During 1973–2022, the number of calibration services provided by TPA reached 897,163 units [17]. Accredited with ISO/IEC 17025 by the Thai Industrial Standards Institute (TISI) of the Ministry of Industry (MOI), TPA has become one of the leading calibration laboratories in Thailand. Currently, it accounts for a 30 percent share of the Thai calibration market. Calibration service now constitutes about 30 percent of TPA's revenue, providing a stable source of funding.

8.2.3.5 Enterprise Diagnosis and Consulting Businesses

Enterprise diagnosis and consulting businesses were modeled after the Japanese enterprise evaluation (*shindan)*[7] system—one of the measures promoted in postwar Japan for SME development. When the Thai economy was hit severely by the Asian financial crisis in 1997–1998, the Japanese government launched the 'New Miyazawa Initiative' to help restore the real economies by providing medium- to long-term financial assistance. It also provided policy advice on the Thai government's Industrial Restructuring Plan by sending a high-ranking official from MITI (so called 'Mizutani Plan') and subsequently supported its implementation focusing on the promotion of small and medium-sized enterprises (SMEs) [22, see also Chap. 5]. Training of SME enterprise/factory evaluators (*shindan-shi*) was one of the priority programs of the Thai government, namely, MOI, and implemented with Japanese cooperation through JODC, AOTS, JICA, Japan Small and Medium Enterprise Corporation, and Japan Small and Medium Enterprise Management Consultant Association.

TPA was entrusted by MOI to serve as the major counterpart organization of the enterprise evaluator training program on the ground and worked closely with Japanese experts in conducting both lecture and in-company training from 1999 to 2002. Through this experience, TPA acquired the expertise to organize a training program, foster in-house experts, and build networks with qualified experts who can

[7] Enterprise diagnosis, or *shindan*, is a comprehensive analysis of enterprise performance from managerial and financial perspectives, with the aim of identifying challenges and opportunities for growth and providing general hints for addressing the challenges and seizing the opportunities. Under the Japanese system, personnel equipped with knowledge and skills for diagnosing enterprises are certified and registered as professional evaluators (*shindan-shi* in Japanese). They play an important role in SME promotion activities [22, pp. 377–78].

serve as master instructors. Based on its accumulated knowledge and expertise, TPA launched enterprise diagnosis and consulting business for SMEs.

As the above experiences show, TPA steadily strengthened its core businesses. It also developed new businesses starting with small-scale pilots, while deliberately avoiding speculative ventures. Being exposed to market competition, TPA management and the heads of departments are always under pressure to come up with new ideas to secure income. Under these circumstances, the TPA staff have constantly looked for ways to survive up until now by studying the trends of Japanese businesses and technologies through JTECS, their counterpart on the Japanese side. In this way, TPA has continuously developed its businesses through trial and error and made efforts to move forward. As a result, TPA accumulated its expertise and financial resources over a long period of time, building the foundation for the establishment of TNI. It is fair to say that solid and realistic management has contributed to the success of TPA today.

8.3 TNI: Promoting *Monodzukuri* Education in Thailand

8.3.1 Origin and Background

TNI is a Japanese-style *monodzukuri* university, building on TPA's 34 years of activities. Authorized by the Ministry of Education in 2006, TNI became fully operational in June 2007. It is a technical education institute established by the Thai people and for the Thai people. The establishment of TNI was funded by retained earnings generated from TPA activities and borrowing from private banks. TNI places strong emphasis on field-based, practical education for manufacturing. It aims to produce human resources who understand basic Japanese language and the corporate culture of Japanese businesses. Most executives of TNI, including the president, are returnees who had studied in Japan or possess experience in TPA management. Many of them were faculty members at well-known universities but joined the management team of TNI to contribute to a new initiative to nurture practical engineers and managers equipped with a *monodzukuri* spirit under the free and open atmosphere of a private university.

8.3.2 Philosophy and Core Values

In May 2020, TNI published the 'Guide to TNI: Monodzukuri Education—TNI Story' (hereinafter referred to as the TNI Guide) to articulate its philosophy, educational policy, and methods to those interested. Here, the meaning of *monodzukuri* is introduced as 'Creative Design and Manufacturing—Japanese Way' [20]. From this,

we can infer how TNI interprets Japanese *monodzukuri* spirit as unique value and why they consider it useful for Thailand's industrial upgrading.

As an academic and specialized technical institute, TNI builds its educational and research activities on two unique strengths: (i) Thailand-Japan relations; and (ii) student development in line with the *Monodzukuri* Principle [20]. First, TNI fully takes advantages of its multi-dimensional relationships with Japan. These include: economic cooperation from the Japanese government and related organizations such as MITI/METI, JTECS, AOTS, former JODC, and JICA[8] for technology transfer; partnerships with the Japanese private sector (both in Thailand and Japan) to educate the youth to meet the 'real' needs of industry; and networks with Japanese universities for educational and research exchanges. Second, TNI considers that Japanese-style *monodzukuri* can be acquired effectively when two types of learning—specific skills and the underlying work ethics and corporate culture—are combined. In other words, it is necessary to learn not only hard (technical) skills but also soft skills, such as problem-based learning (PBL), 5S and *Kaizen*, teamwork, innovation, and communication [20]. To this end, TNI extracts the key elements of Japanese-style manufacturing in an easy-to-understand manner as the Six Core Values and 5Gs of *monodzukuri* principles and includes them in teaching materials.

8.3.2.1 Focus on Six Core Values

TNI focuses on the Six Core Values, called 'KM-HR-HoP.' These include: *Kaizen* (continuous improvement), *Monodzukuri* (dedication, creativity, and development), *Hansei* (accept mistakes and learn from them), Respect (respect yourself and others), Honest (be honest), and Public-interest consciousness (consider the public interests) (see Fig. 8.2). The TNI Guide [20] states that these values are important to realize industrial society and are expected to contribute to self-improvement and enhancement of organizational strengths, which will eventually become the main engine for attaining Quality of Work and Quality of Life.

8.3.2.2 5Gs of *Monodzukuri*

TNI teaches the 'Five-Gen Principles' (5Gs of *Monodzukuri*) which consist of: (i) *Genba* (learning from the work place), (ii) *Genbutsu* (learning from the work environment and real material), (iii) *Genjitsu* (learning from practice in real situations), (iv) *Genri* (learning from theories), and (v) *Gensoku* (learning from rules and regulations). This is based on the key principles of Japanese manufacturing.[9] TNI insists that

[8] JICA cooperates with TNI through the dispatch of senior volunteers (e.g., curriculum development of Engineering Faculty) and a scholarship program 'Innovative Asia' to study at Japanese universities.

[9] In Japanese manufacturing, 'Three-Gen Principles' (*Genba*, *Genbutsu*, and *Genjitsu*) have been widely practiced for a long time. Yuzo Furuhata, who served as an engineer and quality control

5Gs of Monodzukuri

1	現場 Genba	Learning from the workplace
2	現物 Genbutsu	Learning from the work environment and real materials
3	現実 Genjitsu	Learning from practice in real situations
4	原理Genri	Learning from theories
5	原則 Gensoku	Learning from rules and regulations

Fig. 8.2 Six core values and 5Gs of *Monodzukuri* (*Source* TNI [20, p. 5, 19, p. 8])

its manufacturing education differs from the conventional Thai teaching methods, with a stronger focus on practical training to meet the needs of business and industry. Its education covers not only hard technical skills, but also soft skills—the art and spirit of creating high-quality products based on: (i) the culture and value system of Japanese production, and (ii) science, technology, and technical skills that meet the customers' requirements. As such, 5Gs of *Monodzukuri* is a broad concept that applies to not only manufacturing but also information technology and services.

8.3.3 Educational Programs

Over the past 15 years, TNI steadily expanded and diversified its educational programs. In 2007, TNI started with four undergraduate program courses and one master's program course, with 433 students. By 2011, TNI achieved the original target of 1,000 students per school year. By 2022, the number of courses has increased to 21 for the undergraduate program and five for the master's program, with the total of nearly 4,000 students enrolled. After peaking in 2016 with the total of 4,648 students [20], the number of new students tended to decrease due to the country's declining birthrate. But, with the introduction of an adult education program in 2020 (see below), this trend has been reversed since 2021.

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manager at Denso and the president of Kyosan Denki and later became a management consultant, elevated this concept to 'Five-Gen Principles' by adding two Gens (*Genri* and *Gensoku*) based on his conviction that 'Three Gens' need to be backed by theories and formalized into rules (see [1]).

8.3.3.1 Educational Courses

TNI's educational program consists of three faculties: (i) Faculty of Engineering, (ii) Faculty of Information Technology, and (iii) Faculty of Business Administration. Tables 8.3 and 8.4 respectively show the courses offered at the undergraduate (BA) and graduate (MA) programs, and the number of students by course from the academic years of 2007 to 2021.

'Digital Technology in Mass Communication' (see Table 8.3 (2)) and 'Data Science and Analytics' courses (initially (2), currently under TNIC) were introduced in 2018 in response to the requirements of the digital age, while 'Logistics and Supply Chain Management' and 'Digital Marketing' courses ((3)) were added in 2017. Moreover, TNI has flexibly changed the name and content of courses to fit the expectation of industry and society at times. For example, regarding this table (1),

Table 8.3 TNI faculty and courses (as of June 2022)

Program	Faculty	Course
Undergraduate (4-year BA)	(1) Engineering	• Automotive Engineering (AE) • Robotics and Lean Automation Engineering (RE) • Computer Engineering & AI (CE) • Industrial Engineering (IE) • Electrical Engineering (EE)
	(2) Information Technology	• Information Technology (IT) • Multimedia Technology (MT) • Business Information Technology (BI) • Digital Technology in Mass Communication (DC)
	(3) Business Administration	• Management of Technology and Innovation (MI) • Business Administration (Japanese) (BJ) • International Business Management (IB) • Accounting (AC) • Japanese Human Resources Management (HR) • Logistics and Supply Chain Management (LM) • Digital Marketing (DM) • Innovative Tourism and Hospitality Management (TH)
	Thai-Nichi International College (TNIC)	• Digital Engineering (DGE) • Data Science and Analytics (DSA) • Global Business Management (GBM) • Japanese for International Business (JIB)
Graduate program (2-year MA)		• Innovation of Business and Industrial Management (MBI) • Engineering Technology (MET) • Information Technology (MIT) • Japanese Business Administration (MBJ)

Source Elaborated by the author, based on the TNI information .
Note The course list of this table covers the period after the establishment of TNIC in June 2022

Table 8.4 Composition of TNI courses and the number of students (2007–2021)

Program	Faculty	Course	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Undergraduate (4-year BA)	Engineering	Automotive Engineering (AE)	77	157	125	149	185	148	207	149	131	120	112	133	88	69	55	1,905
		Production Engineering→Lean Automation System & Integration Engineering→Robotics & Lean Automation Engineering (RE)		52	73	70	81	57	33	92	78	48	50	26	21	14	22+15	732
		Computer Engineering & AI (CE)		90	116	133	107	92	86	94	77	66	81	69	76	54	75	1,216
		Industrial & Logistics Engineering→Industrial Engineering (IE)						29	52	65	71	72	51	38	35	25	18	456
		Electrical & Electric Engineering→Electrical Engineering (EE)							38	93	72	61	58	52	35	29	30	468
		Digital Engineering (DGE)												27	14	15	16	72
		Subtotal	**77**	**299**	**314**	**352**	**373**	**326**	**416**	**493**	**429**	**367**	**352**	**345**	**269**	**206**	**231**	**4,849**
	Information Technology	Information Technology (IT)	89	136	187	90	113	78	91	125	115	93	95	60	58	63	68	1,461
		Multimedia Technology (MT)				87	129	106	111	117	111	143	136	109	116	139	151	1,455
		Business Information Technology (BI)				73	33	37	38	64	52	46	45	35	19	25	22+8	497
		Digital Technology in Mass Communication (DC)												40	30	23	29	122
		Data Science & Analytics (DSA)												8	13	9	7	37
		Subtotal	**89**	**136**	**187**	**250**	**275**	**221**	**240**	**306**	**278**	**282**	**276**	**252**	**236**	**259**	**285**	**3,572**
	Business Administration	Industrial Management→Managemetn of Technology & Innovation (MI)	93	114	158	110	134	105	94	139	96	96	37	36	51	21+6	24+13	1,327
		Business Administration (Japanese) (BJ)		148	203	218	242	194	160	173	158	191	169	157	158	125	141	2,437
		Industrial Management – Continuing Program (IMC)	37	31	33		19	14	31	17	5	Suspended						187
		International Business Management (IB)						104	163	109	128	149	95	67	75	69	74	1,033
		Accounting (AC)							75	66	69	92	57	35	26	22	19+9	470
		Japanese Human Resources Management (HR)								103	72	102	43	36	20	17	27+14	434
		Logistics & Supply Chain Management (LM)											82	47	48	54+15	59+22	327
		Digital Marketing (DM)											54	31	21	21	26	153
		Innovative Toursim & Hospitality Management (TH)													39	31	24	94
		Global Business Managemnet (GBM)												26	17	16	10	69
		Subtotal	**130**	**293**	**394**	**328**	**395**	**417**	**523**	**607**	**528**	**630**	**537**	**435**	**455**	**397**	**462**	**6,531**
		Total of undergraduates	**296**	**728**	**895**	**930**	**1,043**	**964**	**1,179**	**1,406**	**1,235**	**1,279**	**1,165**	**1,032**	**960**	**862**	**978**	**14,952**
Graduate School (2-year MA)	Engineering Technology (MET)						20	30	28	20	15	12	14	9	11	10	8	177
	Information Technology (MIT)						16	23	13	7	12	13	15	28	23	24	21	195
	Industrial Management→Innovation of Business and Industrial Management (MBI)		137	41	38	30	31	81	34	35	14	21	17	8	13	10	8	518
	Strategic Planning & Management for Entrepreneurs→Lean Manufacturing System & Logistics Management (LMS)			43	35	28	26	30	35	14	12	4	14	10		8	9	268
	Japanese Business Administration (MBJ)									25	23	14	21	14	16	8	17	138
		Total of graduates	**137**	**84**	**73**	**58**	**93**	**164**	**110**	**101**	**76**	**64**	**81**	**69**	**63**	**60**	**63**	**1,296**
		Total of students enrolled	**433**	**812**	**968**	**988**	**1,136**	**1,128**	**1,289**	**1,507**	**1,311**	**1,343**	**1,246**	**1,101**	**1,023**	**922**	**1,041**	**16,248**

Source: Elaborated by the Author, based on TNI information.

Note: 1) Because this table covers the period up to 2021 (before the establishment of TNIC), the course list does not necessarily coincide with that of Table 8-3 which includes TNIC.

2) TNI launched adult education program in 2020. The table includes the figures of those enrolled in adult education program (21 persons in 2020, 81 persons in 2022), as indicated with +.

'Robotics and Lean Automation Engineering' course was initially called 'Production Engineering' and then 'Lean Automation and System Integration Engineering.' Regarding Table 8.3 (3), 'Management of Technology and Innovation' course was changed from 'Industrial Management.' Regarding the master's program, the current 'Innovation of Business Management and Industrial Management' was initially called 'Industrial Management,' and 'Lean Manufacturing Systems and Logistics Management' was called 'Executive Enterprise Management.'

TNI recently launched two initiatives: (i) establishment of Thai-Nichi International College (TNIC) in 2022 as an international education program; and (ii) opening of an adult education program in 2020. First, TNI started to teach several courses in English from August 2018, aiming at providing opportunities for youth from the neighboring Association of Southeast Asian Nations (ASEAN) countries to learn *monodzukuri* education. This program was upgraded and institutionalized in 2022, on the occasion of TNI's 15th anniversary (see Sect. 8.4.4 for details).

Second, in 2020, TNI introduced a new program for working adults, offered on weekends online. This program provides practical training in industrial technologies demanded by business today, and a bachelor's degree is granted in a minimum of two and a half years. The program has earned popularity, and the number of course has expanded to nine by 2022.[10] This was the time where the entire world suffered from the COVID-pandemic. But, TNI proactively responded to the crisis and initiated online classes.

8.3.3.2 Emphasis on Language Education

To increase the employability of its graduates at Japanese companies or their local suppliers, TNI attaches importance on Japanese language education. This is based on the belief that theoretical knowledge alone is not sufficient to understand how Japanese *monodzukuri* has developed and that it is necessary to combine language and cultural education with technical education. The majority of the courses incorporate a total of 225 hours of Japanese lessons into the four-year curriculum (elective from the second semester of the second year) to train engineers and managers who can understand the certain level of Japanese language and the Japanese way of doing business. In the case of the Business Administration course which specializes in Japanese language, students are required to take a total of 540 hours of Japanese lessons over four years. For TNIC, English is the primary language of instruction, and the Japanese lessons are limited to 140 hours.

[10] The nine courses under the adult education program include: (i) Faculty of Engineering—Robotics and Lean Automation Engineering, Industrial Engineering; (ii) Faculty of Information Technology—Information Technology, Business Information Technology; and (iii) Faculty of Business Administration—Management of Technology and Innovation, Accounting, Japanese Human Resources Management, Logistics and Supply Chain Management, Digital Marketing.

As a result, TNI boasts a 100 percent employment rate of graduates, with about half of them working for large companies and SMEs respectively. As TNI graduates can speak Japanese, many Japanese companies are interested in hiring them. About 40 percent of TNI graduates seeking jobs find employment with Japanese companies or their local suppliers in Thailand.[11]

8.3.3.3 Collaboration with Industry Circle

Strengthening industry engagement is a major challenge for TVET institutions in developing countries [11]. In this sense, it is worth noting TNI's efforts to build strong industry-academia linkages and provide field-oriented and practical education. Two examples are given below.

First, regarding curriculum development, TNI has been making efforts to incorporate the industry needs into its curricula. At the time of its establishment, TNI conducted a survey to identify their needs [10]. For example, the curriculum for Automotive Engineering course was designed with the support of Toyota's Training Center, and the introductory part of the Toyota Production System has been taught in the course. TNI also incorporated material engineering and the use of CNC machine tools into its curriculum, in response to the request by companies. In addition, TNI advisors visit several industrial parks once a month to hold coordination meetings with tenant companies.

More recently, under the Thailand-Japan Industrial Human Resource Development Initiative launched in late 2015 by then Japanese ambassador to Thailand, TNI newly established the 'Monodzukuri Engineer Program' in collaboration with Japanese companies, for courses taught at the Faculty of Engineering. This program focuses on *Kaizen* and automation of the manufacturing process and combines learning the Six Core Values (KM-HR-HoP), Japanese and English languages, theory and methodology (related to engineering studies), practical training based on the PBL method, engagement on a specific project (for the graduation thesis), and internships at Japanese companies (see Fig. 8.3).

It should be noted that internship is one of the prerequisites for TNI graduation and that the students are required to complete either: (i) a four-month (full) internship to earn credit, or (ii) a two-month internship as part of their graduation thesis, in the second semester of the senior year. The TNI program expects that students would be accepted by about 200 companies as interns, and staff members are in daily discussions with companies. There are cases where students find jobs at their internship sites after graduation.

[11] According to the TNI Guide [20], about 57 percentof TNI graduates from the Engineering Faculty found employment with Japanese companies or their local suppliers during 2016–2018, while about 40 percent of those from the Information Technology and Business Administration Faculties did so.

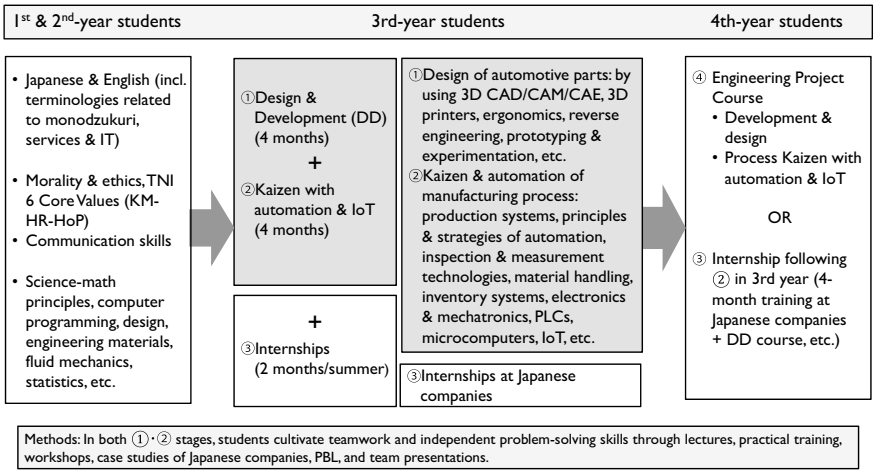

Fig. 8.3 Key features of TNI Monodzukuri engineer program (*Source* Elaborated by the author, based on TNI [19])

Second, TNI has established collaborative partnerships with Japanese and local companies by utilizing the TPA networks and its own management team. The nature of such partnerships is mutually beneficial. On the one hand, TNI would expect companies to provide: (i) scholarships, (ii) training equipment, (iii) short-term lectures at TNI by their in-house experts, and (iv) internship opportunities. On the other hand, the companies would expect TNI to train and supply qualified students. In particular, the Japanese Chamber of Commerce, Bangkok (JCC) plays a key role in facilitating TNI's partnership with Japanese companies.[12] The JCC has a TNI Committee that meets roughly once every three months, and TNI is asked to submit activity reports twice a year. As it is practically impossible for TNI to visit all companies to ask for their contributions, JCC's cooperation has been considerably helpful to TNI. The JCC has been supporting scholarships for TNI since its establishment. The JCC networks also contribute to the provision of equipment and the dispatch of lecturers to TNI.

[12] TNI annually provides scholarships for about 200 students. There are three types of scholarships (THB30,000, THB60,000, and THB90,000), and the majority receive THB30,000. In 2022, JCC contributed to THB500,000 (approximately 2 million Japanese yen). https://admission.tni.ac.th/old/web/tni2014-jp/index.php?option=contents&category=18&id=30.

8.4 TPA and TNI under the New Landscape of Industrialization

8.4.1 New Landscape of Industrialization

The landscape of industrialization is changing rapidly with the progress of digitalization and globalization. In particular, Thailand is facing rising labor costs and labor shortages due to a declining birthrate. Therefore, it has become essential to improve productivity and skills by using digital technology, in order to continue industrial upgrading and overcome the middle-income trap. Moreover, the establishment of the ASEAN Economic Community (AEC) in 2015 has created a common market within the ASEAN region; Thailand, which is already a manufacturing hub in the region, has an opportunity to expand its production network to neighboring countries while maintaining its own mother factories in the country.

Against this background, the Thai government has launched the 20-year National Strategy: 2017–2036 [13]. Accordingly, MOI has formulated the Strategic Plan (2017–2021) as the direction of industrialization for the first five years. The plan calls for the promotion of industrial transformation through science, technology, and innovation, the enhancement of entrepreneurial capabilities and competitiveness in the global market, and green industrialization. In particular, this strategic plan emphasizes 'Thailand 4.0' as an economic model to transform the Thai economy into a value-based economy and specifies 10 targeted industries [7, 18].[13]

In response, TPA and TNI are developing new activities in partnership with MOI, the business community, and foreign investors including Japanese companies, to contribute to Thailand's industrial advancement and human resource development. They are also promoting the internationalization of respective organizations, taking advantage of the opportunities presented by regional economic integration. The following sections explain three recent developments of TPA and TNI in the areas of digitalization and economic integration.

8.4.2 Smart Monodzukuri Support Team Scheme: Integrating Kaizen *into the IoT Process*

Factory automation and robotization are a challenging task, particularly for SMEs which lack human resources familiar with using IoT and robots. It is also necessary to

[13] Under the concept of Thailand 4.0, the 10 industries are divided into two categories: 'First S-curved' and 'New S-curved' industries. The former are the existing industries expected to further enhance their competitiveness based on the country's current strengths (new-generation automobiles, smart electronics, medical and wellness tourism, agriculture and biotechnology, and food processing). The latter includes the new industries expected to become major growth drivers in the future (manufacturing robotics, medical hub, aviation and logistics, biofuel and biochemicals, and digital industries).

promote *Kaizen* before robotization because productivity will not increase if robots are taught tasks that are wasteful. Therefore, it is important to take a step-by-step approach to lean automation, such as: (i) promoting IoT (machine visualization), (ii) understanding workers' movements to reduce machine waste and wasteful movements (human movement visualization), and (iii) identifying tasks that are better handled by robots and planning the automation/robotization of those tasks.

To address such challenges faced by Thai SMEs, MOI is collaborating with the Japanese government (METI) to introduce the 'Thai Smart Monodzukuri Support Team Scheme.' This scheme is modeled on the recent Japanese experiences of smart manufacturing support to SMEs by METI and local governments.[14] A pilot project was conducted during 2019–2021, aimed at the development of Thai human resources (training of master instructors and trainers) capable of providing hands-on guidance on on-site *Kaizen* and the introduction of IoT and robotization. With the support of JTECS and AOTS and funding from METI, Japanese experts conducted training in the form of classroom lectures and on-site training at model companies.

A total of 48 Thai IoT support instructors (29 master instructor candidates and 19 instructor candidates) were trained over the three-year period, with 10 Thai SMEs participating as model companies. The trained master instructor candidates came from MOI, consulting companies, manufacturing companies, and educational institutions, while the instructor candidates came from manufacturing companies and educational institutions. Some of them are qualified SME factory evaluators [4]. MOI has shown a strong commitment and sent three staff to the training for IoT support instructors (master instructor candidates). Based on the positive assessment of the pilot project,[15] MOI has decided to institutionalize this scheme with its own budget from 2022. It plans to upgrade the ministry's consultant registration system by adding a new category of expertise related to IoT/robotization and to promote training activities by mobilizing the human resources trained in the pilot project.

Taking advantage of this new trend, TPA proactively participated in the MOI/METI project for 'Thai Smart Monozdukuri Support Team Scheme.' With its expertise in *Kaizen* and *shindan* activities and rich experience with technology promotion, TPA is positioning itself to play a key role in implementing training activities for IoT support instructors.

Here, two points are worth noting. First, quite a few TPA and TNI personnel were trained as IoT support instructors. This should enable the accumulation of knowledge and the management of the future expansion of 'Thai Smart Monodzukuri Support

[14] Like Thailand, Japanese SMEs face challenges in introducing IoT and robotization into their production and management processes. Since 2016, METI and local governments have been supporting the promotion of smart manufacturing in SMEs in various localities by organizing lectures and in-company training by experts familiar with IT technologies, *Kaizen*, and lean automation.

[15] According to JTECS, the results of questionnaire surveys of both Japanese experts and trainees showed a high level of satisfaction and achievement. The model companies which participated in the pilot project also indicated strong expectations for the creation and institutionalization of the Smart Monodzukuri Support Team.

Team Scheme,' in collaboration with MOI. Second, TPA has assumed an important role as a local partner to Japanese experts in organizing activities within the pilot project. For example, TPA undertook the invitation and nomination of training participants, the selection of model companies, and the preparation and implementation of classroom and on-site training, based on its long-standing understanding of the operation of training and consulting business.[16] TPA also organized seminars to disseminate the results by model companies, by utilizing its network with Thai industry and Japanese companies. At the model company where training took place, the *Kaizen* team became the recipient of support for the introduction of IoT and robotization.

It should be noted that despite the COVID-19 pandemic which prevailed from early 2020, the pilot project was implemented without disruption and produced the expected results. Although Japanese experts could not travel and had to conduct remote training in the second and third years, the 11 Thai master instructor candidates trained in the first year were able to implement the project as planned. These Thai instructors conducted both classroom training and on-site company training, assisted by Japanese experts online. This again reconfirms a vital role played by TPA as a local partner in continuing the operation of the pilot project during this difficult time.

*8.4.3 Thailand-Japan Investment Promotion Project (*J-SME Project*)*

The recent decade has seen a new wave of internationalization of Japanese SMEs. With the shrinking domestic market due to ageing and a declining birth rate and fierce competition with emerging economies, the traditional Japanese-style production relations, where the parent company and subsidiaries had close contracting relationships, crumbled. As a result, the number of manufacturing SMEs in search of new markets that sought to expand overseas independent of large parent companies increased dramatically.[17] In particular, Southeast Asian countries such as Thailand, Vietnam, and Indonesia have become favored destinations of Japanese SMEs. From around 2011, national and local governments in Japan began actively supporting the overseas business expansion of Japanese SMEs.

Although Japanese manufacturing SMEs possess high-level skills and technologies, they used to rely on the parent company and have limited overseas network, marketing, and communication capabilities. It has become essential for

[16] Candidates were recruited and selected through such channels as MOI, TPA, TNI, AOTS Thai Alumni Association, and Japanese companies.

[17] This is different from the past patterns of SMEs overseas expansion, where SMEs bound in subcontracting relationships with large corporations would be asked by the parent company to relocate their production networks overseas (see [14]). In terms of destination, there has been an increase in outward Japanese FDI into Southeast Asia to avoid the risks associated with doing business in China.

those Japanese SMEs to find reliable local business partners, which could give information on worker recruitment, markets, procurement of parts and raw materials, and so on. In sum, this new era of SME internationalization necessitates building much deeper and co-creative partnerships with Asia.

Against such a background, TPA launched the Thailand-Japan Investment Promotion Project (J-SME project) in 2013. This project is designed to provide various support services to Japanese SMEs interested in expanding businesses in Thailand, by leveraging TPA's unique strengths. At the end of 2021, TPA had 34,705 registered members (including both individuals and corporates), the majority of which were Thai people and companies [17].[18] With accumulated manufacturing expertise and extensive networks with Thai and Japanese companies, the J-SMEs project aims to promote cooperation between Thai and Japanese companies and allow them to grow together through joint ventures and other collaborations rather than competition. More specifically, the J-SME project offers such services as: (i) business matching between Thai and Japanese companies including visits to Thai companies; (ii) training and seminars for both Thai and Japanese SMEs; (iii) consulting services for technology and management; and (iv) arrangement of interpreters and translation services. This suggests that Japanese SMEs and local governments are increasingly seeking advice from TPA and its local business networks, casting them in the role of learners.

8.4.4 Thai-Nichi International College (TNIC): New International Education Program

As explained in Sect. 8.3, TNI has so far focused on nurturing students to meet the needs of Japanese companies. Recently however, it has launched new initiatives aimed at equipping students with the skills required in this era of digitalization and globalization, while taking advantage of Thailand's strengths as a manufacturing hub in Asia and ASEAN. A good example is its international program, designed to create an environment where young Thais and their Asian neighbors can learn together skills needed by today's industries.

In June 2022, TNI established a new independent Thai-Nichi International College (TNIC) by consolidating the courses in English which were opened within the existing faculties in 2018. TNIC runs four programs: (i) Digital Engineering (DGE), (ii) Data Science and Analytics (DSA), (iii) Global Business Management (GBM), and (iv) Japanese for International Business (JIB). TNIC is open to Japanese students, in addition to students from neighboring countries and other Asian countries. While English is the main language of teaching, students are required to learn Japanese

[18] TPA membership consists of: (i) full members (limited to those studied and received training in Japan); and (ii) supporting members (which include both individual and corporate members). At the end of 2021, TPA has 2,376 full members, and regarding supporting members, 24,854 individuals and 7,475 corporates are registered. Together, these total 34,705 [17].

and IT skill improvement. There is also a study abroad system in Japan and various opportunities such as internships at Japanese universities and companies are prepared.

TNIC is notable in five ways. First, it provides an opportunity to learn digital skills and corporate innovation in English for the new era of globalization. Second, the curriculum is designed so that foreigners can easily understand and learn useful Japanese ideas and methods, including 'Japanese-style *monodzukuri*.' Third, students can learn diverse values and cultures and interact with students from other countries in Thailand, which has become a manufacturing hub in Asia. Fourth, while learning to communicate in English, students will have the opportunity to study Japanese and Thai. Fifth, there is a scholarship program for outstanding students (including Japanese students). It is noteworthy that TNI has launched its own initiative to teach Japanese-style manufacturing to other countries in the context of the new era, to become a central hub for Japanese technology transfer in Asia and ASEAN. Such initiative also suggests the changing nature of partnerships between Thailand and Japan toward mutual learning, with TNI taking a proactive role in sharing its knowledge and experiences on the teaching side.

8.5 Development of TPA and TNI from a Perspective of Translative Adaptation and Local Learning

The previous sections reviewed the origin, major activities, and key features of TPA and TNI. This section analyzes how TPA and TNI have learned industrial technologies and *monodzukuri* mindset from Japan and developed localized mechanisms for their diffusion. Special attention is given to the process of their local learning and translative adaptation, presented in Chap. 1.

8.5.1 Five Stages of Development of TPA and TNI[19]

Since its foundation in 1973, TPA has developed in five stages: (i) learning from Japanese experts (technology transfer); (ii) nurturing Thai experts while reducing dependence on Japanese experts (technology promotion); (iii) building capacity of local companies through training and consulting activities (technology diffusion); (iv) establishment of TNI as a private university specializing in Japanese-style *monodzukuri* (technology education), aimed at wider segments of the Thai society including the young generation; and (v) expanding their activities from Thailand to Asia and learning digital technologies (overseas expansion and innovation). During

[19] This section is based on a lecture given by Hiroyuki Yoneda [23] and a chapter by Ohno [15] as part the research project 'Strategic Network Building with "Pro-Japan" Asian Monozukuri Human Resources' of the Asia Pacific Institute of Research (APIR) and subsequent updates by the author. Mr. Hiroyuki Yoneda is former executive director of JTECS.

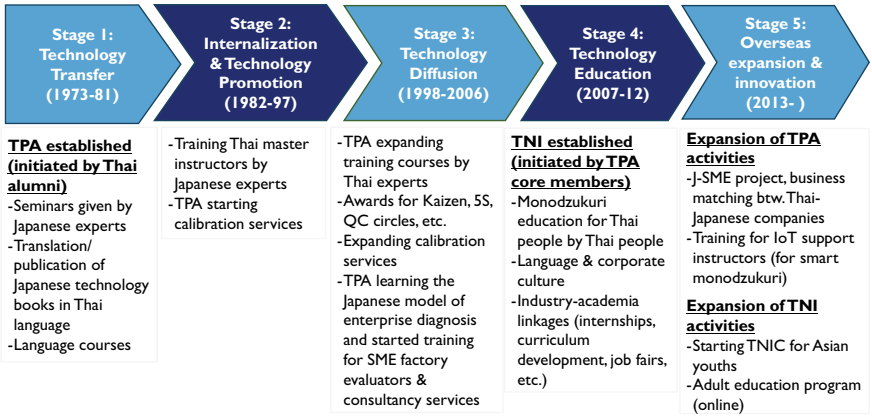

Fig. 8.4 Five-stage development of TPA and TNI (*Source* Elaborated by the author, based on Yoneda [23], Ohno [15], and JTECS [5]; *Note* The period is approximate. Stages 4 and 5 overlap)

the course of its development, TPA has built up networks with a variety of industrial, governmental, and academic organizations in both Thailand and Japan. It has also secured its own revenue sources by gradually introducing new business activities. These independent revenue sources have made it possible to establish TNI in 2007—a long-standing dream of TPA [9]. Figure 8.4 summarizes the five stages of development of TPA and TNI.

At the first stage (around 1973–1981), TPA intensively received the transfer of technologies from Japan by inviting Japanese experts. This learning process was facilitated by JTECS. TPA was not just passive. The lectures by Japanese experts, as well as technology books and textbooks were translated into the Thai language by TPA members, who had studied in Japanese universities. Moreover, TPA launched Japanese language courses for Thai nationals, based on the recognition that an understanding of the language is a good entry point for learning the Japanese way. It also began to provide Thai language courses to Japanese people working in Thailand. These language courses benefited both Thai and Japanese companies operating in Thailand and proved to be profitable for TPA.

At the second stage (1982–1997), efforts were made to internalize foreign technologies taught by Japanese experts and foster Thai master instructors capable of conducting technical training (Training of Trainers) in such areas as quality and productivity management, *Kaizen*, and Total Productive Maintenance (TPM). This aimed at avoiding the Thai side's permanent dependence on Japanese experts. Gradually, TPA's master instructors began to train Thai nationals, with the support of Japanese experts. These Thai trainees were sent to Japan to experience and better understand Japanese-style management so that they can become experts providing on-site training. In addition, TPA became one of the first institutions in Thailand offering calibration services for industrial measuring instruments, making an important contribution to quality improvement of both Thai and Japanese companies.

Calibration services contributed to enhancing TPA's income generating capability. TPA organized the first quality control (QC) contest in the country.

The third stage (around 1998–2006) involved the dissemination of technologies to Thai industry and business circles. At this point, TPA became capable of expanding training courses taught by Thai instructors. The newly established TPI building has facilities and equipment to conduct training programs in various fields and greatly contributed to scaling-up training and calibration services. This was also the time when TPA learned the Japanese model of SME factory evaluators (*shindan-shi*) through a project commissioned by MOI and supported by the Japanese government to cope with the Asian financial crisis [12, 22]. TPA acquired the knowledge to offer training and consultancy for enterprise diagnosis and launched new services for SMEs. In fact, the participation of MOIs in the project increased the profile of TPA, which in turn led to the expansion of its training courses and strengthened TPA's profitability. As Sucharit Koontanakulvmong, former President of TPA, stated, 'the financial crisis of 1997 was both a crisis and a window of opportunity' and 'this combination of crisis and opportunity was particularly valuable for TPA' [9].

The fourth stage (2007-around 2012) includes the provision of technical education through the establishment of TNI. TPA has for long time embraced its goal of creating a Japanese-style manufacturing university to develop high-quality human resources who could contribute to the industrial development of Thailand.

As of around 2013, TPA and TNI are entering into the fifth stage of development. Both institutions are expanding activities overseas and enhancing their capacities to prepare for the age of digital technologies. This includes the J-SME project and the more recent 'Thai Smart Monodzukuri Support Team Scheme,' in partnership with MOI. Similarly, TNI has been enhancing an international education program through the establishment of TNIC in 2022 targeted at Asian youth. It also added new courses related to digital technology, digital marketing, and data science and launched an online program for working adults in 2020.

The five-stage TPA and TNI development can be understood as a further evolution of the three-stage process of translational adaptation presented in Chap. 1 (see Fig. 1.2). They have actively learned various production management technologies (such as *Kaizen*, 5S, QCC, TPM) and the *monodzukuri* mindset from Japan, and created localized mechanisms for their dissemination among Thai people and enterprises, through training, consulting, and educational activities. It is notable that their developments go beyond the three stages. Through the establishment of TNI, they have built a mechanism for promoting *monodzukuri* education in broader segments of the Thai society including youth and working adults—which could lead to societal learning. More recently, TPA and TNI are actively engaged in overseas expansion of their experiences, particularly in Asia.

8.5.2 Key Factors for Successful Development of TPA and TNI

As described above, TPA and TNI are successful examples of translative adaptation and local learning. What factors have contributed to their development with operational sustainability? On the Thai side, five factors deserve special attention.

8.5.2.1 Strong Ownership and the Existence of Dedicated Core People on the Thai Side

The primary factor contributing to the success of TPA and TNI is the existence of a core group of Thai people who had strong ownership and enthusiasm for learning external knowledge. Studying in Japan during the 1950s–1960s, the founders of TPA keenly recognize the need to introduce Japanese technology and management methods to promote industrial development of Thailand. They were also aware that in Thailand, 'technical education based on learning practical skills through field-based, hands-on experiences is lacking' [10]. The anti-Japanese movement spreading in Southeast Asia in the early 1970s also drove them to act in order to bridge the two countries through industrial development.

Here, 'enthusiasm' is not passion without concrete thinking. TPA leaders thought realistically about the feasibility of achieving their goals and the concrete steps to be taken. While receiving support from Japan, they did not seek excessive assistance, giving serious consideration to the ownership and sustainability of their initiatives. Such proactive thinking is exemplified by the fact that instead of asking for large-scale financial assistance, they used TPA's internal reserves accumulated over 30 years of activities when they embarked on the establishment of TNI. TPA core members regarded their knowledge and networks with Japanese industrial technologies as unique strengths and took a step-by-step approach to building institutional and financial capabilities through trial and error.

8.5.2.2 TPA Efforts to Secure Financial Autonomy

TPA has worked hard from an early stage to secure financial autonomy and create revenue-generating businesses. TPA leaders were conscious of building a financial and organizational basis (including the establishment of a secretariat office) that enables it to operate independently while receiving support from Japanese public and private sectors. Major efforts were made to accelerate learning, establish its own fee-based services, and promote technology diffusion to Thai companies and people. While initially learning from Japanese experts, they were conscious about developing local capability and initiated various training programs, enterprise diagnosis, and consultancy. Such TPA efforts can be seen as a good example of 'aid for graduation.' From the beginning, both the Thai and Japanese sides had shared an understanding that external support would phase out and that TPA should become a self-sustainable

organization in the future. The TPA core members fully recognized this point and embedded self-sustainability in their operations from the early stages.

8.5.2.3 TPA as a Social Enterprise/NPO

Viewed from today's perspective, it is possible to regard TPA as a pioneer of social enterprise. As a NPO serving the public interest, TPA has provided an organizational environment where motivated members can engage in entrepreneurial initiatives.[20] The TPA management team (part-time) and regular members have their own occupations and participated in TPA activities in their personal capacity. They are sensitive to the needs of Thai industry and have proactively introduced new technologies and knowledge from Japan, with the support of JTECS.

Because it is a social enterprise, TPA was able to develop flexibly its members' ideas into innovative business projects. While belonging to various organizations of industry, government, and academia in Thailand, they had a common interest in learning from Japan and developing Thai industry. TPA members are mainly: (i) former international students (many of whom became researchers and educators after returning from Japan); and (ii) former AOTS trainees (who worked for Japanese companies in Thailand and local suppliers after returning from Japan). Those from companies understood the expectations and needs of Japanese companies for Thai human resources, while researchers and educators had the knowledge to support the production of textbooks and teaching materials in the Thai language in order to disseminate Japanese industrial technology and knowledge.

8.5.2.4 Multifaceted Networks Among Industry, Academia, and Government

TPA and TNI have built multifaceted networks among industry, government, and academia in Thailand and Japan. These have contributed to amplifying learning opportunities and promoting technology dissemination within the industry circle and broader segments of the society. Multifaceted networks between Thailand and Japan have also facilitated the understanding of the industrial needs of both countries. Four types of networks are particularly notable.

The first is the network with industry in Thailand. TPA has strong ties with Thai industry and close relationships with Japanese companies in Thailand and their local suppliers that have sent their staff to Japan for training programs implemented by AOTS. On the Japanese side, the JCC in Bangkok acts as a hub for networking with Japanese companies operating in Thailand. It has set up an internal TNI Committee that cooperates with TNI in such areas as the support to scholarships, the provision

[20] Based on the author's interview with Bandhit Rojarayanont, then TNI President in November 2016. Rojarayanont served as Secretary General of TPA (2001–2009), Vice President of TNI (2009–2014), and TNI President (2014–2020). During 1978–1991, he taught at the Engineering Faculty of the Chulalongkorn University.

of training equipment, the dispatching of lecturers, and the provision of internships as mentioned earlier.

Second is the network with the Thai government. Later, some ex-international students who studied at Japanese engineering universities during the 1960s and 1970s became senior officials of the Thai government. Because they share experiences and values regarding Japanese manufacturing with the core members of TPA, TPA has been in a good position to obtain recognition and understanding of its activities from the government. The support of Japanese MITI/METI has also contributed to facilitating TPA's partnerships with the Thai government, particularly MOI. For example, Panuwat Triyangkulsri (currently, Deputy Permanent Secretary of MOI[21]) graduated from the Tokyo Institute of Technology and is known as one of the most knowledgeable Japan alumni in the Thai government. Panuwat himself has been involved in industrial cooperation with various Japanese organizations including the introduction of SME enterprise evaluation or *shindan* [12].

Third is the network with universities and companies in Japan. Since its opening, TNI has placed great emphasis on partnerships with Japanese universities, as well. The number of Japanese universities that signed the Memorandum of Understanding (MoU) with TNI has grown significantly, reaching 74 as of February 2022. Various exchange programs are being implemented, such as sending TNI students to Japanese universities for studies (both short- and long-term stays), accepting Japanese students at TNI for short-term seminars, inviting short-term visiting lecturers from Japan, organizing study tours for TNI faculty and students, and research collaboration. In particular, exposure to Japanese *monodzukuri* education seems to be effective for both faculty and students. Currently, about 200 TNI students per year go to Japan through exchange programs [20].

Lastly, there is the fourth network that TPA and TNI have built with various Japanese organizations as mentioned in the previous sections. Although the Japanese government and public institutions no longer give any direct financial support to TPA or TNI at present, they provided substantial support in the early stages of TPA development. Even now, TPA and TNI continue to collaborate with them on a project basis, including the latest 'Smart Monodzukuri Support Team Scheme,' supported by Japanese METI.

8.5.2.5 Embedding Incentives Mutually Beneficial for Both Thai and Japanese Sides

Finally, in the industry-academia-government networks mentioned above, there exist embedded incentives attractive to both Thai and Japanese stakeholders. TPA has been providing useful services to industry, such as Japanese language courses, calibration of measuring instruments, training in industrial technology, and enterprise diagnosis and consulting, in response to the evolving needs of Thai industry. Recently, Japanese SMEs and local governments have expressed high expectations that TPA

[21] Based on the informatin at the time of writing (August 2022).

could leverage its networks with Thai companies and people to facilitate business partnerships.

There is a large demand from Japanese companies and local suppliers for TNI graduates, which is why the JCC has been supporting TNI since its establishment. As a token of gratitude to the scholarship sponsors, TNI holds a job fair every January, setting up booths on campus to provide opportunities for company presentations and recruitment. Approximately 110 Thai and Japanese companies (large and SMEs) participate in annual job fairs.

8.5.3 The Role of Japanese Industrial Cooperation

Donors have an important role to play in facilitating translative adaptation and effective learning of partner countries. As the outsiders, they must be mindful of the values presented by local partners and proactively understand and accept their views and propositions [2, 16]. In this regard, the Japanese side has provided distinctive support in the establishment and development of TPA [8]. Much of the support for TPA and TNI has been provided through JTECS as a Japanese counterpart organization, under the new cooperation framework building on the 'Hozumi spirit' (see Sect. 8.2.2).

8.5.3.1 The Role of JTECS as a Learning Facilitator in Public–Private Partnerships

JTECS has acted as a facilitator of local learning and technology transfer, connecting TPA and TNI with various support organizations in Japan including both public and private sectors. Looking back to the 1970s, Kondo [8] views this cooperation framework as a 'pioneer of public–private partnerships.' Two points are worth noting.

First, for many decades, JTECS has functioned as a contact point for receiving ODA and economic cooperation for Thailand, primarily funded by MITI and implemented by AOTS and JODC. Because TPA and TNI are private organizations, MITI's support for them did not take the form of conventional bilateral ODA, which is implemented as government-to-government cooperation. JTECS also coordinated various kinds of support from the Japanese private sector for TPA and TNI.

For example, JTECS encouraged the Japanese side to participate in the projects that TPA and TNI were eager to realize [23]. JTECS supported fundraising for the establishment of TPA-affiliated TPI and encouraged TPA to convince MITI and JTECS member companies of its significance by inviting TPA representatives to Japan. Regarding TNI, JTECS established a TNI Support Committee on the Japanese side, and the then-president of JTECS actively publicized the importance of TNI to the Japanese media. After its establishment, JTECS has been serving as a bridge between TNI and Japanese universities to promote their exchanges. As such, JTECS has served as a coordinator of economic cooperation based on public–private partnerships.

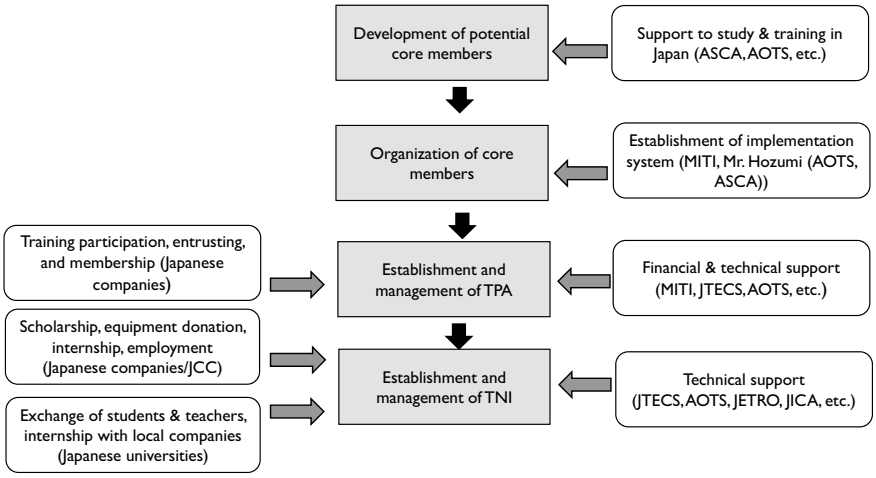

Fig. 8.5 Japanese support to TPA and TNI (*Source* Elaborated by the author based on Mori [10])

Second, ownership of the Thai side has been fully respected, and the Japanese government refrained from influencing their decision and management of TPA. Although the Japanese government provided financial support through JTECS, it was TPA and TNI that identified the needs of local beneficiaries and provided direct services to them. At the same time, 'Japan does not interfere' does not mean the Japanese side did nothing. For example, JTECS dispatched experts based on the requests of TPA and TNI and arranged training programs to be conducted in Japan. It also organized internship programs in Japan (which involved the identification of and coordination with host organizations), produced technology-related publications, and provided other services.

The support from JTECS and economic cooperation from various organizations (such as AOTS, JODC, JETRO, and JICA), as well as the Japanese staff at TPA and TNI (seconded by JTECS), was never insignificant. The development of training programs that matched the needs of the times and partnership with Japanese companies would not have been possible without the hard work of Japanese staff. In other words, today's success of TPA and TNI is made possible through joint efforts by the Thai core team and the JTECS staff who worked behind the scenes with a strong sense of mission.

Figure 8.5 shows how TPA and TNI have been supported in various forms by various people over a long period of time.

8.5.3.2 The Role of Japanese Mentor

The successful establishment and growth of TPA cannot be discussed without Goichi Hozumi, a social educator and the first President of JTECS (see Sect. 8.2.1). Hozumi

served as an unparalleled Japanese mentor. The 'Hozumi spirit' continues to serve as the backbone of the relationship between JTECS and TPA and TNI. As he was also the President of ACSA and AOTS at that time, international students and trainees in Japan received guidance and profound inspiration from him. Furthermore, JTECS staff at the time of its establishment were seconded by staff from ACSA and AOTS. They were also influenced by the Hozumi spirit. In sum, on both the Japanese and Thai sides, those who shared the same values gathered at JTECS, TPA, and later TNI and embarked on a new venture together.

8.6 Conclusions and the Way Forward

The experience of TPA and TNI serves as concrete, useful reference for how developing countries can enhance capacity for learning external knowledge and technologies and localizing them for broader dissemination, and how donors could facilitate such a process. It also offers insights into today's context of learning as Thailand has become a key player in the regional economic integration and is promoting industrial transformation through Thailand 4.0. As a concluding section, let us highlight the following five points.

First, the five-stage development of TPA—technology transfer, internalization and technology promotion, technology diffusion, technology education, and overseas expansion and innovation—goes beyond the three-stage process of policy learning and translative adaptation presented in Chap. 1. With the establishment of TNI, they have even created a mechanism for promoting *monodzukuri* education in broader segments of the Thai society including youths and working adults, thus contributing to societal learning. Furthermore, TPA and TNI are now willing to share and teach their experiences abroad, particularly with other Asian economies.

Second, there are five key factors on the Thai side that have contributed to sustainable growth of TPA and TNI. These are: (i) strong ownership and the existence of dedicated core people on the Thai side; (ii) TPA efforts to secure financial autonomy; (iii) TPA as a social enterprise; (iv) the creation of multifaceted networks with industry, academia, and government; and (v) incentives that are mutually beneficial for both the Thai and Japanese sides. While all the factors may not be replicable in other countries, developing countries seriously interested in learning to catch-up are encouraged to assess their situations in these lights and consider how to move forward. Regarding (i) in particular, Thai international students and ex-trainees acted as catalysts for learning, technology and knowledge diffusion, and innovation for Thailand's industrial development. Without their passion and dedication, it would not have been possible to build the foundation and self-sustainable development of TPA and TNI.

Third, the contribution of Japanese industrial cooperation, channeled through JTECS, should be also noted. The Japanese side provided distinct support to TPA and TNI. JTECS has acted as a learning facilitator in public–private partnership in Japan and between Japan and Thailand, while respecting ownership and needs of

TPA and TNI. TPA has always been run independently, and the Japanese side did not intervene its operations and management. The Japanese side has kept its stance to provide hands-on support tailored to the needs of the Thai side. While such a stance may be partly the reflection of the prevailing anti-Japanese movement at that time, the principle of respecting Thai ownership has continued until now. Various Japanese organizations provided support for the growth of TPA and TNI, with JTECS playing the role of learning facilitator through public–private partnerships.

Fourth, there have been qualitative changes in the nature of partnerships between the Thai and Japanese sides over the past 50 years. In the past, Japan was in the position to teach the Thai side, with its absolute economic power and capability to mobilize ODA and private sector support. However, as their recent initiatives show, the Thai side has begun to play a proactive role by providing advisory services to Japanese SMEs and local governments (J-SME project) and creating space for co-learning through an international program (TNIC) for young Thai, Japanese, and other Asian students. These suggest that the learning process is increasingly becoming two-ways, toward mutual learning and learning together for shared objectives between the Thai and Japanese sides. The nature of bilateral partnership is changing.

Fifth, the recent efforts of TPA and TNI suggest the promising possibility of combining the conventional Japanese-style manufacturing, such as *Kaizen*, with IoT and the robotization of production processes. Both TPA and TNI have begun to introduce digital technology in respective industrial services (such as the Smart Monodzukuri Support Team Scheme) and educational courses (such as AI, data analysis, factory automation). Interestingly, they are incorporating new technologies on the foundation of the core value and 5Gs of *monodzukuri*. Here, new technologies are regarded as complementary, not a replacement of the conventional Japanese-style manufacturing value. This is a useful finding to think about the future of industrial development.

This chapter primarily focused on the successful experiences of TPA and TNI. But, there are also challenges to be addressed in the future. Let us conclude by highlighting two issues. First, looking into the future, TPA and TNI need to continue their efforts to find the technologies and ideas necessary for Thailand's continued industrial progress, capture their essence, and introduce them with localization to the Thai industry and society—as they did in the past. Especially in an era of rapid change, the ability to discern promising and appropriate technologies is becoming even more important. Today, Japan-born technologies and ideas may no longer be the only and superior ones, and TPA and TNI can learn from a wide range of external knowledge and technologies available. This requires an even more sophisticated capacity for learning and translative adaptation.

Second, there is a challenge of how to foster and sustain the young generation of the core people who could lead their organizations with good understanding of Japanese-style manufacturing. As explained before, the development of TPA and TNI was supported by dedicated core members that have knowledge and a keen interest in learning Japanese industrial technologies and the *monodzukuri* mindset. Many of them studied and received training in Japan during the 1960s–1970s. In the past

decades, Japan had dominant technological and economic power over Thailand and the other Asian countries and provided large-scale ODA to Thailand. Against this backdrop, in Thailand there exists a thick layer of human resources, like the founders of TPA, who are willing to learn Japanese industrial technologies and corporate culture and apply them to their own country's industrialization. Now that Thailand has become an upper middle-income country and a manufacturing hub in the ASEAN region, graduating from ODA, it is important to make enhanced efforts to continuously build such human resources among the younger generation in Thailand. It is also important to increase opportunities for young people in both Japan and Thailand to study and work together, sharing their own values and thinking about the future of Asia. To this end, we should be reminded that Japan itself must continue to be attractive to them.

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Part III
Translative Adaptation in a Changing World

Chapter 9
Kaizen and Non-cognitive Skills Development in Africa in the Age of Digitalization

Kimiaki Jin

9.1 Introduction

We are now in the age of changes spurred by globalization and digital transformation. Uncertainty has also been accelerated by pandemics and other geopolitical events. Under such circumstances, how to deal with these changes attracts people's interest.

Kaizen can be one of the entry points to improve adaptability amidst these types of changes. In many cases of *Kaizen* application at the company level, there are rich *Gemba* observations of concrete improvements such as the reduction of the defect rate of products and the increase of labor productivity in associated production lines [14, 35]. In addition to these firm-level impacts, macro-level impacts are also observed in some countries such as Japan, Singapore, and Ethiopia [24, 28, 34]. At the same time, there is limited research on the micro-level impacts of *Kaizen,* such as on teams and individuals. This chapter attempts to investigate micro-level impacts of *Kaizen*, particularly on individuals, in order to deepen our understanding of its effects.

More specifically, this chapter focuses on individual capacity and skill development promoted by *Kaizen* activities, with special attention to non-cognitive skills. Non-cognitive skills are the personal attributes not thought to be measured by IQ tests or achievement tests but include attributes identified as soft skills, personal traits, non-cognitive abilities, character skills, and socio-emotional skills [26]. These non-cognitive skills are increasingly important for accessing job opportunities in the digital era. They are also effective to deal with changes caused by COVID-19. In fact, a recent study shows that *Kaizen* activities have improved teamwork, communication skills, and learning attitude of workers, which can be a part of non-cognitive skills [24]. The author argues, based on case studies in Africa, that group and team

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activities promoted by *Kaizen* methodologies develop non-cognitive skills and can make people more proactive to deal with change.

The chapter is structured in six sections. Following the introduction, Sect. 9.2 reviews the definition and evolution of *Kaizen* and discusses how *Kaizen* is related to theories of leaderships and motivation in business management and capacity development. Section 9.3 reviews key arguments on non-cognitive skills to clarify a framework of the following arguments. Section 9.4 analyzes the impact of *Kaizen* on non-cognitive skills development by referring to *JICA Kaizen Handbook* and three case studies on Africa—a survey in Ethiopia, COVID-19 responses, and the impact of digital transformation. Section 9.5 discusses the implications extracted from the analysis and Sect. 9.6 concludes.

9.2 Evolution of *Kaizen* and Its Relation with Business Management and Capacity Development

Kaizen in Japanese is a general term that means improvement. However, *Kaizen* as a technical term in management is a comprehensive knowledge structure of quality and productivity improvement (QPI) and has become an English term.[1] It has had a significant impact on global manufacturing technologies as well as business management. This section touches on these impacts and evolution observed in Western business fora based on broad context related to *Kaizen*.

9.2.1 Definition and Evolution of Kaizen

The quality of products and services is an essential factor for determining the strength of business and industry, and for creating customer satisfaction and trust. Higher productivity in business brings advantages for firms in terms of improved efficiency and competitiveness in their target markets. Therefore, QPI is crucial to support the development of industries and services and to ensure their success in the modern economy. This is in particular an indispensable step in transforming the African economy and realizing its potential so that African industries can compete in international markets and participate in global value chains.

Sonobe [40] defines *Kaizen* in the context of its promotion in Africa. Based on discussions with *Kaizen* experts working for the project supported by the Japan International Cooperation Agency (JICA), he regards it as the management philosophy and knowledge that brings about continuous, participatory, incremental, and low-budget improvements in quality, productivity, cost, delivery, safety, morale, and environment (or QPCDSME). It is also a collection of ideas and insights that many

[1] The Oxford Dictionary of English (2003) indicates that *Kaizen* is 'a Japanese business philosophy of continuous improvement of working practices, personal efficiency, etc.'

managers and workers from firms in the manufacturing and service sectors have created and refined through observations and experiments carried out over several decades in Japan and other parts of the world [40, p. 4].

There are many concrete *Kaizen* tools and methodologies to improve quality and productivity in workplace. The 5S (sort, set in order, shine, standardize, and sustain) method is the most fundamental for the purpose of improving the work environment to make it more efficient. *Muda* (waste) elimination is an activity to identify and eliminate actions and processes that do not produce any additional value. Standardization of the production process can lead to an optimum operation plan that consists of the required manpower, the skill levels of workers, and the cycle time of each step, which works as a benchmark to identify problems and points to be improved. Seven quality control (QC) tools[2] are used to sort out data, analyze current problems, and identify countermeasures. A QC story is a standardized procedure for problem-solving or task-achieving, while a QC circle is a unit of small group activities organized at the workplace to improve work on the production floor. Total Quality Management (TQM) is a comprehensive system that includes ideas, tools, and mechanisms to maintain and improve quality in general at companies, whereas Total Productive Maintenance (TPM) is a system to maintain the health and efficiency of machines used in operations.

Kaizen is an evolving term, and this is consistent with the characteristics of its continuous and cyclical process. In fact, there are many concrete cases that explain the evolution of the concept of *Kaizen*. *Kaizen* was started in the Japanese private sector to learn foreign management technologies (mainly from the United States (US)). It is well known that the American method of statistical quality control was the base of a Japanese-style QC circle. However, QC methodologies have been modified and adjusted to the conditions of the Japanese workplace and skill levels of workers. Toyota Motor Co. developed its own production systems, collectively known as the Toyota Production System (TPS), that are well known as *muda* elimination, Just-in-Time (JIT) systems, and *jidoka.* TPS includes many tools and methodologies such as the Material and Information Flow Diagram for rectification of flow, *Kanban* for pull production and pull inventory, and *Andon* for visual management.

Six Sigma is a problem-solving method developed by Motorola, Inc. of the US in the early 1980s. It is said that this method was invented with reference to Japan's QC circle activities, factory floor *Kaizen* activities, TQC, TQM, and TPS [27]. General Electric (GE) introduced Six Sigma to successfully carry out its wide-ranging quality upgrade program. Six Sigma was introduced not only in the manufacturing departments but also in the non-production business departments throughout the company. What was emphasized during its application process was the clear definition of who their customers were and what the focused problems and issues for improvement were [13].

The Lean Production System (or 'Lean') was developed in the US as a method for thorough elimination of *muda* with reference to TPS in the middle of the 1990s.

[2] The seven QC tools are the control chart, Pareto chart, cause and effect diagram, check sheet, histogram, stratification, and scatter diagram.

It has since become widely known and used by not only the manufacturing sector but also the service sector such as health and public service delivery. Although Lean is said to hardly differ from TPS, some researchers claim that these systems differ in several respects. For example, in the Western society business environment, Lean focuses on technical issues rather than human aspects that are the focus of TPS [10]. Kikuchi and Suzuki [27] argue that there is a 'Japanese style' *Kaizen* and a 'Western style' *Kaizen* that includes Six Sigma and Lean Production.

TPS (and Lean) also influenced the development of industrial technologies and labor management as a concrete case of psychological safety. Psychological safety describes a condition in which workers feel comfortable asking for help, sharing suggestions informally, or challenging the status quo without fear of negative social consequences in the organization they work for [9]. *Andon* is a tool of TPS that workers can use to notify co-workers of process problems and request their support as a part of visual management. *Andon* can be effective in a company to promote mutual support among workers as a common norm and allow workers to stop the production line based on their own decision without hesitation; but cannot be effective under a culture of vertically divided task-systems in which individual workers cannot express own idea freely [38]. Hence, the company that introduces *Andon* in an effective manner coupled with other mutual support activities within *Kaizen* demonstrates a concrete commitment to psychological safety in the workplace.

A QC circle is a small group activity developed in Japan as an after work voluntary activity, which is sustained by strong feelings of belonging and loyalty to the company. In Africa, small group activities such as the Kaizen Promotion Team (KPT) in Ethiopia are not voluntary but are half-time assignments.

Knowledge is always linked with the culture and environment from which it originates. *Kaizen* methodologies and tools are also influenced by the work ethics and labor-management relations where they are born. Therefore, *Kaizen* technologies need to be customized for sustainable utilization wherever they are applied. We call this process translative adaptation because international knowledge transfer under the framework of overseas development cooperation is often influenced by cultural differences. The asymmetric power balance between the provider and the recipient of knowledge is a point of contention. In the context of development cooperation, the outsiders are the ones who need to understand the values and implications of translative adaptation and proactively accept the views and propositions presented by the insiders [25].

9.2.2 Review of Business Management Theories from a Perspective of Kaizen

To discuss *Kaizen* in the context of business performance, it is important to touch upon global standard business management theories. One entry point is the difference between top-down and bottom-up approaches to management. The top-down

approach is effective when solutions for problems to be solved are already available whereas the bottom-up approach is effective when a solution is not yet clear. The bottom-up approach is also important when a given solution needs substantive involvement of people in the workplace or in the field. Apart from this, in order to focus on skill development of individuals in relation to team/circle activities, the author includes the knowledge creation theory, leadership theory, and motivation theory.

The knowledge creation theory presented by Ikujiro Nonaka and his co-researchers is a valuable theory of business management and innovation and has strong link with *Kaizen* practices. Nonaka observed small group activities in Japanese manufacturing companies and found practices through which people utilize their own tacit knowledge and convert it into explicit knowledge. His SECI model[3] emerged from small group activities such as the QC circle of *Kaizen*, although he emphasizes the importance of an abductive leap[4] of ideas in addition to the incremental process of *Kaizen* [30, 31, 33]. The theory is also applicable in the service sector to convert people's knowledge to wisdom and promote innovations that meet mental and emotional values of customers [32].

Leadership is one of key topics that influences organizational management and group dynamics, so that attracts many researches and arguments. According to Bernard Bass, leadership is an interaction between two or more members of a group that often involves structuring or restructuring a situation, and that occurs when one group member modifies the motivation or competences of others in the group [18].

Although there is rich accumulation of knowledge and theories around leadership, one of recent arguments focuses on comparisons between transactional leadership styles and transformational leadership styles. Transactional leadership styles focus on the use of rewards and punishments in order to achieve compliance from followers while transformational leadership styles serve to enhance the motivation, morale, and job performance of followers by stimulating their identity, interest, and ownership.

Another interesting comparison is between vertical and shared leadership. Shared leadership is characterized by the broad distribution of leadership and responsibility to people within a team and organization. Pearce and Sims [36] argue, based on their research over performance of change management teams in a large automotive manufacturing firm in the US, that a conscious strategy of distributing leadership to team members is likely to enhance team effectiveness.

Motivation influences people starting, continuing, or terminating a certain behavior or action. Intrinsic motivation that is stimulated by inherent interest can be contrasted with extrinsic motivation that is driven by an external reward. It has been argued that intrinsic motivation has more beneficial and creative outcomes. Motivation may define the reason why people work in modern society. A major reason shared among many people may be to earn wages or other resources to support the survival of themselves or dependents. Some people may find their own place or sense

[3] Knowledge creation model consists of four dimensions, namely Socialization, Externalization, Combination, and Internalization (SECI).

[4] An abductive leap is a combination of abductive inference and a leap in logic.

of belonging through working, whereas others may find that working serves a self-actualization purpose by providing a value for existence. Each individual may have several reasons to work at the same time.

In his book about motivation, Daniel Pink argues that self-direction is at the heart of our intrinsic motivation towards creativity. He refers to the self-determination theory of Deci and Ryan and considers that 'human beings have an innate inner drive to be autonomous, self-determined, and connected to one another' [37, p. 73]. He also categorizes Motivation 2.0 as fueled by extrinsic desires (external rewards) and Motivation 3.0 as fueled by intrinsic ones. His conclusion is that autonomy leads to engagement that strengthens Motivation 3.0 for higher commitment, growth, and creativity.

Self-efficacy is an individual's belief in own capacity to achieve something related to specific goals. A strong sense of self-efficacy promotes human accomplishments and motivation to set higher goals. Self-efficacy is developed from external experiences and self-perception and is influential in determining the outcomes of many events. Similar words to self-efficacy include self-esteem and self-confidence. Self-esteem is more of a present-focused belief while self-efficacy is more of a forward-looking belief. Self-confidence is an individual's trust in their own abilities, capabilities and judgements, or belief that they can successfully face day to day challenges and demands. Self-confidence is similar to self-efficacy but it seems to be based on prior performance [1]. However, in this chapter, the author uses self-efficacy and self-confidence interchangeably.

Leadership at the organizational or team/circle levels and the motivations of team members are some key elements for the successful application of *Kaizen* activities. *Kaizen* is based on bottom-up and participatory activities so that transformation and shared leaderships are something we can often observe as opposed to a top-down control approach to management. *Kaizen* also relies on the motivation of workers to contribute to the improvement of the workplace. Such motivation can be sustained and strengthened by self-confidence (or self-efficacy) backed up by successful experience. For leaders, how to stimulate motivation and self-confidence among team members is always an important question. There are many practices that stimulate extrinsic motivation such as giving bonuses that offer monetary incentives, awards that provide recognition, and promotions that entrust additional power and responsibility. However, recent arguments emphasis the importance of intrinsic motivation of people to be creative and innovative. The relationship between the participatory human-centered nature of the *Kaizen* approach and intrinsic motivation is one of the points the author is going to discuss in the context of non-cognitive skills.

9.2.3 Kaizen *from a Perspective of Capacity and Skill Development Theories*

In previous articles regarding *Kaizen* promotion in Africa, the author argued for the effectiveness of *Kaizen* on the capacity development of individuals [23, 24]. Capacities are categorized into technical capacities and core capacities. They can also be stratified into individual capacity, organizational capacity, and enabling environments according to the concept of capacity development promoted by JICA [19]. This concept was developed in line with the capacity assessment framework of the United Nation Development Programme (UNDP) [45].

Hosono et al. [16] define core capacity as generic and cross-cutting competencies and the ability to commit and engage, identify needs and key issues; plan, budget, execute, and monitor actions; and acquire knowledge and skills. They point out that the challenge is how to effectively enhance such cross-cutting core capacity.

The organizational core capacities may have close links with the concept of organizational culture. Individual core capacities are the central force in determining the ability to handle issues such as the discipline, will, attitude, leadership, and management capability needed to produce desirable results through the use of technical capacities. Individual core capacity in the context of skill development can provide more specific frameworks that refer to non-cognitive skills, socio-emotional skills, and socio-behavioral skills. These are also called soft skills.

The author argues that people who practice *Kaizen* activities experience an impact on these skills [23, 24]. Because *Kaizen* is a scientific, data-based approach, it can also contribute to the development of individuals' technical capacity. In parallel, *Kaizen* can also influence core capacities that share common elements with 'socio-behavioral skills' such as aptitude for teamwork and empathy pointed out by the World Bank [49] in the context of the changing nature of work described later.

9.3 Review of the Arguments on Non-cognitive Skills Development

9.3.1 *Importance of Non-cognitive Skills*

Before going into details, the definitions of capacity, capability, and skills are briefly discussed. According to the Merriam-Webster Dictionary, capacity is the potential or suitability for holding, storing, or accommodating, or an individual's mental or physical ability. Capability is the quality or status of having attributes (such as physical or mental power) required for performance or accomplishment. Skill is a learned power of doing something competently, which means it is something that can be developed. Skill is a part of capability, and capability constitutes capacity in a simplified sense,

although there are some exceptions. Therefore, discussions on skills can illustrate details related to the concepts of capacity and capability.

Skills are largely divided into cognitive skills and non-cognitive skills. Cognitive skills include literacy, numeracy, and problem-solving skills. Non-cognitive skills are, according to Kautz et al. [26, p. 13], 'the personal attributes not thought to be measured by IQ tests or achievement tests.' They include the attributes identified as soft skills, personal traits, non-cognitive abilities, character skills, and socio-emotional skills.

Among the arguments on skill development, the importance of non-cognitive skills has been increasing, although there are several definitions of non-cognitive skills. Zhou [51] reviews these definitions and classifies them in three groups that are: (i) perseverance/grit,(ii) self-control; and (iii) social skills. In his reviews, he explains that perseverance/grit is a trait that helps us to meet long-term or higher-order goals in the face of challenges and setbacks. Self-control is the capacity for altering one's own responses, especially to bring them into line with standards such as ideas, values, morals, and social expectations, and to support the pursuit of long-term goals. Social skills constitute the ability to establish compatible and effective relations with others, or an ability to use appropriate social behaviors that are pleasing to others in interpersonal situations. However, his conclusion is that 'there's no standard established to track non-cognitive skills development in different stages. Non-cognitive skills assessment cannot be used as a tool to demonstrate accountability' [51, p. 10].

Mindset is a mental inclination, tendency, or habit of a person. Carol Dweck [8] published a book titled *Mindset* in which she claims that there are two different types of mindsets of people. One is a fixed mindset, and another is a growth mindset. People with fixed mindsets believe that the abilities of people are fixed and fundamentally unchangeable. On the other hand, people with growth mindsets believe that abilities can be developed and improved through one's own effort, learning, and interaction with one's environment. She emphasizes that people's attitudes toward learning, practicing, and even relationships with others are affected by these mindsets. That means people with growth mindsets can strengthen perseverance/grit and self-control and overcome their own failures better than those who have fixed mindsets.

Grit is known as a positive, non-cognitive trait on an individual's perseverance of effort in psychology. Duckworth [6] points out that grit[5] is combination of passion and perseverance that makes high achievers special. Grit is mutable and growable and can be developed in two ways: through individual effort and by surrounding oneself with people who have strong culture of grit. Interestingly, she supports the interaction between *Kaizen* and strong grit in her book. She writes:

> *Kaizen* is Japanese for resisting the plateau of arrested development. Its literal translation is: "continuous improvement." A while back, the idea got some traction in American business culture when it was touted as the core principle behind Japan's spectacularly efficient manufacturing economy. After interviewing dozens and dozens of grit paragons, I can tell you that they all exude kaizen. There are no exceptions. [6, p. 142]

[5] Thaler and Koval [42] write that GRIT stands for guts (G), resilience (R), initiative (I), and tenacity (T) in their book titled *GRIT to Great*.

The World Development Report published in 2015 *Mind, Society, and Behavior* focuses on behavioral economics. The report shows that, 'Policies that expose individuals to new ways of thinking and alternative understandings of the world can expand the available set of mental models and thus play an important role in development' [48, p. 13]. It further says that, 'Automatic thinking, social thinking, and thinking with mental models also play a large role in worker motivation and the investment decisions of farmers and entrepreneurs' (16). A part of the conclusions is that, 'a more complete consideration of the psychological and social factors involved in decision making may offer "low-hanging fruit"—that is, policies with relatively large gains at relatively low cost' (20).

These arguments illustrate that academics in education, behavioral science, business management, and behavioral economics are showing increasing interest in non-cognitive skills that are understood using psychology and mental models.

9.3.2 Digital Technologies and Non-cognitive Skills

Digital technologies have been generally improving the efficiency of work and reducing the workload of people. The impact of digital technologies such as information and communications technology (ICT) and artificial intelligence (AI) on job opportunities are analyzed and discussed in many papers in recent years. Frey and Osborne [11] conclude that 47% of workers in the US work in occupations at risk of being substituted by digital technology in the next 10–20 years. However, Arntz et al. [3] re-simulate the impact based on the tasks of occupation instead of the occupations and conclude that only 9% of jobs in the 21 member countries of the Organisation for Economic Cooperation and Development (OECD) can be automated.

Regarding the relation between tasks and occupations, an occupation consists of jobs, a job consists of tasks, and a task matches with the specific skills of people. In this sequence, skill development can contribute to the performance of tasks and task performance secures jobs even in the environment of digital transformation [22].

Meanwhile, several writers have pointed out the importance of non-cognitive skills in the coming age of digital transformation. For example, the Asia Development Bank Institute has published a report that comments as follows:

> The learning outcomes in the present and future context require not only visible cognitive knowledge and skills to be acquired by learners but also non-cognitive ones, such as interpersonal, problem-solving, critical thinking, conflict-managing, and emotion-managing skills; these are often referred to as soft skills or 21st century skills. [2, p. viii]

Banga and te Velde published a series of papers regarding the impact of digital technologies in developing economies and write as follows:

> In the context of the digital economy, the study identifies core skills that can directly increase [the] competitiveness of [a] workforce, and ancillary skills that either remain relevant or support the digital economy, but do not directly contribute to it. Core skills that need to be developed include: a) job-neutral digital skills; b) job-specific digital skills; and c) job-neutral soft skills such as communication, management, analytical and critical thinking and

> creativity. Ancillary skills that can support the digital economy include: a) physical skills that require dexterity; and b) socio-emotional and interpersonal skills for service and sales occupations. [4, p. 29]

The World Development Report 2019 *The Changing Nature of Work* argues similarly, stating, 'three types of skills are increasingly important in labor markets: advanced cognitive skills such as complex problem-solving, sociobehavioral skills such as teamwork, and skill combinations that are predictive of adaptability such as reasoning and self-efficacy' [49, p. 3]. Socio-behavioral skills mentioned in the report are: 'teamwork' (3), 'managing and recognizing emotions that enhance teamwork' (23), 'positive attitude and good communication skills, ability to work independently and as part of a team' (23), 'an aptitude for teamwork, empathy, conflict resolution, and relationship management' (50), 'creativity and curiosity' (70), 'commitment to work' (72), and 'teamwork, resilience, self-confidence, negotiation, and self-expression' (80). The report says that socio-behavioral skills are acquired in one's early childhood and shaped throughout one's lifetime (10).

These arguments are created because routine tasks using middle-level skills such as machine operation, clerical work, and tasks in assembly-lines can be easily codified and can be performed by digital technologies, but tasks related to non-cognitive skills and socioemotional skills are, in addition to high-level cognitive skills, less likely to be performed by digital technologies [4].

JICA and JIN Corporation[6] [22] conducted a study of the firm-level impact of digital technologies in Ghana and South Africa. The study finds that, in the current situation, firms introduce digital tools and systems for (i) accounting and administration,(ii) marketing and sales; and (iii) ICT tools as major technologies. They expect to introduce tools/systems for (iv) manufacturing technologies and (v) products management within three years. And the study observes that, consistent with the theory of capital-and-labor-productivity-optimization-behavior and local business norms, management in almost all of the 37 firms surveyed do not layoff labor when they introduce digital technologies. Instead, management reallocates staff to other tasks in the intrafirm value-chain. In this sense, the skills of labor matter in the adjustment. The outline of the survey and its findings are explained in Sect. 9.4.4.

On the other hand, Yamada and Ohno explore another important aspect. During the COVID-19 pandemic, many schools introduced remote lessons and online materials for instruction, which were highly dependent on the motivation of students rather than teachers to meet learning goals. Within a digitalized work environment, a similar situation can be observed in the relationship between management and workers, in that workers need to assess their own performance and address problems using their own communication skills [50, p. 318].

Table 9.1 shows the comparison between core capacities, non-cognitive skills, and socio-behavioral skills. There are several subskills that are common in these skill definitions although no standard definitions of them exist.

[6] The name of the consulting firm who conducted the study is the JIN Corporation coincidentally. The author of this chapter does not have any personal relationships with this Corporation.

Table 9.1 Comparison of core capacities, non-cognitive skills, and socio-behavioral skills

Core capacities argued by Jin [24]	Non-cognitive skills by Kautz et al. [26]	Non-cognitive skills by Zhou [51]	Soft and its ancillary skills by Banga and te Velde [4]	Socio-behavioral skills by World Bank [49]
• Will • Mindset • Attitude • Learning attitude • Management capabilities • Leadership • Teamwork • Communication	• Soft skills • Non-cognitive attributes • Personal traits • Character skills • Socio-emotional skills	• **Perseverance/Grit** (passion, motivation) • **Self-control** (ideas, values, morals, social expectations) • **Social skills** (ability of establishing relations with others, ability to use appropriate social behaviors in interpersonal situations)	• Analytical and critical thinking • Management • Creativity • Communication • Socio-emotional and interpersonal skills	• Resilience • Self-confidence • Creativity • Curiosity • Emotion • Teamwork • Communication • Self-expression • Negotiation • Empathy • Relationship management • Conflict resolution

Source Created by the author

Considering these arguments, the issue of how to strengthen the non-cognitive skills that include the mental and psychological factors of people is an interesting and practical one to discuss, although the definition of non-cognitive skill is still not truly clear. This study focuses on Zhou's classification and the components of each class, namely (i) perseverance/grit: passion and motivation; (ii) self-control: ideas, values, learning attitude, creativity, and curiosity; and (iii) social skills: teamwork, communication, leadership, and other interpersonal skills. Perseverance/grit and self-control seem to have similarities and are overlapping. The interpretation is that the former is a trait used to go through challenging conditions, while the latter is one that includes broader values. Development of non-cognitive skills is mainly argued to occur in the context of education. And much literature argues that early child education is an important process for developing non-cognitive skills [49]. However, the importance of the development of the non-cognitive skills of adults who have already started their career should be stressed. Adults also have to adopt new skills and perform new tasks in the coming digitalized era.

9.4 Analysis of Impact of *Kaizen*

9.4.1 Outcomes of Kaizen *Activities that Relate to Mindset*

Kaizen is a well-known concept of QPI with a set of systems, methodologies, and tools. The development of this concept started with learning statistical quality control methods and applying data based on a scientific approach. The collection of data and the analysis of cause and effect are basics of the approach. Some of standard approaches of *Kaizen* include the identification of a vital cause that can bring total optimization, the application of countermeasures, and the monitoring of key performance indicators (KPIs). Through these practices, workers and management can learn technical skills, such as accurate data collection and logical ways of thinking, that we call learning by doing. Therefore, there is no doubt that practicing *Kaizen* contributes to the development of technical skills that are characterized as cognitive skills. It also develops skills related to the collection of statistical data that is compatible to digital technologies. In this sense, the role of engineer is important although not many engineers are employed by the manufacturing SMEs in Africa. Apart from these common facts, the chapter argues about soft skills.

Masaaki Imai writes that, in contrast to innovation, *Kaizen* emphasizes human efforts, morale, communication, training, teamwork, involvement, and self-discipline, and is a commonsense, low-cost approach to improvement [17, p. 4].

According to the *Kaizen Handbook* published by JICA [20], the *Kaizen* approach is a set of tools and methodologies for QPI that are: (i) participatory, (ii) continuous, (iii) data-based and scientific, (iv) economical or efficient, and (v) universally applicable practices in their implementation process. *Kaizen* can also produce many outputs/outcomes in the workplace according to the Handbook, such as: (i)

improving quality, productivity, and service level and reducing cost and delivery time, (ii) changing the mindset of managers and workers, (iii) fostering personnel who can think and act by themselves, (iv) building teamwork and enhancing communication, (v) creating strong organizations that keep evolving and developing, and (vi) creating safe and comfortable work environment [20, p. 1–1]. Although the outputs/outcomes need to be examined, measured, and analyzed because some of the descriptions are not based on academic research findings, they are aspects drawn from a shared understanding among practitioners through their long working experiences. We may say they are based on the tacit knowledge of practitioners.

Of the above six outputs/outcomes, (i) the improvement of quality and productivity has been verified by various research activities that have used a series of KPIs such as cost of production, defect rate, and/or the lead time of products. The safe and comfortable work environment listed as (vi) is also monitored by the rate of accidents and the voices of workers through interviews, questionnaire surveys, or discussion. However, the creation of strong organizations that keep evolving and developing as listed in (v) is an ambiguous explanation that is difficult to measure and verify. This may relate to the continuation of *Kaizen* practices, and may be examined if we can monitor the differences in the survival rates of organizations with or without *Kaizen* under changing business environments caused for example by the COVID-19 pandemic or digital transformation.

The remaining three outputs/outcomes: (ii) the changing mindset of managers and workers, (iii) personnel who can think and act by themselves, and (iv) strengthened teamwork and enhanced communication, are related to effects on individuals. These effects are considered as changes in non-cognitive skills, as mindsets and independent thought and action relate to perseverance and self-control, while teamwork and communication relate to social skills. Although these traits are not easily monitored and evaluated as Kautz et al. [26] write—'not thought to be measured by IQ tests and achievement tests,'—improvement of these skills are often pointed out by *Kaizen* practitioners. In addition, JICA's *Kaizen Handbook* declares 'the core value of "*Kaizen*" is placed on creating the attitude shared among all members of an organization who consistently pursue advanced levels of quality and productivity, and not just applying its management method' [20, p. 1–1]. This is the shared attitude to consistently pursue an advanced-level *Kaizen* mindset.

9.4.2 *A Case of Mindset Change Prompted by* Kaizen *in Ethiopia*

In Ethiopia, the author conducted a questionnaire survey in 2018 to analyze the impact of *Kaizen* and collected 38 replies[7] from 33 *Kaizen* promoting companies/organizations. Respondents to the survey are *Kaizen* leaders or the management

[7] In a large company/organization, *Kaizen* officers in different departments who organize activities for different issues and timing replied.

of companies/organizations. In response to the question on what kind of positive changes, if any, have been created by *Kaizen* activities, 33 out of the 38 respondents selected the mindset of workers. This was followed by material flow (30 respondents) and efficiency of machinery (25 respondents), based on multiple choice answers [24]. Out of the 33 who chose the mindset change, 29 selected improvement of teamwork, 25 selected communication, and 23 selected learning attitudes as their breakdown of mindset changes.

In the same survey, 22 respondents answered that they observed spillover effects outside of their company such as at the residences of their workers and at the workplaces of business partners. One concrete case of spillover effect is observed in a sugar factory in a large-scale plantation in Ethiopia. The frontline workers who were impressed by the participatory nature of the *Kaizen* approach, particularly 5S and the activities of the Kaizen Promotion Team (KPT, the customized version of a QC circle in Ethiopia) at their own workplace started organizing communal cleaning activities at their residential area and tackling local crime through community policing [24, pp. 102–103, 21].

This case shows an interesting spillover of practices because the technical skills that workers obtain through 5S and *muda* elimination at the workplace are not directly related to the cleaning activities of the community, such as cutting grass and cleaning out mud from a drain, but are related to the value of the living environment and the initiative to promote collective actions. These communal activities in the residential areas require a mindset oriented towards creating positive change, promoting collective work, and communication and teamwork. We may assume that KPT activities can influence the organization of collective work because both require communication and consensus building among members in addition to the move towards improvement. Therefore, the measurement of the spillover effect of *Kaizen* in the activities that are not directly-linked with technical/cognitive skills can show effects on the non-cognitive skills of workers, such as will and motivations, since the technical and cognitive skills are not triggering factors of the activity.

9.4.3 Impact of Kaizen *Activities on COVID-19 Responses*

Regarding responses on the impact of the COVID-19 pandemic, there are many countermeasures applied toward infection control by the government, public and private organizations, and individuals. The government introduced lockdowns and restrictions on the movement of people. Many organizations have introduced work shifts, remote work, and extra hygienic practices of handwashing, mask wearing, and keeping social distance from their own workers and customers in the workplace. The effectiveness of these measures depends on whether people are disciplined and follow rules consistently. For the introduction of new workstyles such as remote work and new production systems, individual willingness to accept new systems is a key variable.

At the occasion of the online Africa Kaizen Annual Conference (AKAC)[8] held in September 2020, the author collected replies to a questionnaire regarding the effectiveness of *Kaizen* activities to improve responses to COVID-19 from 53 participants in the conference. In response to the question asking if the *Kaizen* is effective in overcoming challenges caused by the pandemic, 33 selected 'yes-very much,' 16 selected 'yes-some extent,' 1 selected 'not much,' and 3 selected 'I don't know,' out of the five choices[9] (see Fig. 9.1(1)). In response to a question asking how a *Kaizen*-type mindset influences coping with COVID-19, 26 respondents made descriptive comments that included multiple factors. Among these 26 respondents, 12 mentioned a mindset toward proactiveness to find/accept new things is useful, followed by 9 who mention the communication system of organization and skills of individuals are positively influenced. Six respondents refer to a mindset to keep rules/discipline, another 6 picked teamwork, and 4 mentioned that leadership is influential (see Fig. 9.1(2)).

One of the key arguments presented by a Japanese *Kaizen* consultant in the form of video lecture series entitled: 'How to cope with COVID-19 by utilizing *Kaizen*' is that there is a chance to turn adversity into opportunity [21]. On one hand, *Kaizen* encourages managements and workers to review their own costs of operation and reduce waste to make the company more resilient in crisis situations. On the other hand, it is important to advise audiences to analyze changing demand in the market that a company wants to target, examine own business capacity and potential, then try to identify potential products/services that the company can produce.

By connecting the strength of value creation with the identification of potential demand in a market, the marketing story can be visualized. In actual practice, it is also important to proceed properly with verification by applying the Plan-Do-Check-Act (PDCA) cycle. Problem analysis, visualization, and verification require high-level cognitive skills consisting of data collection and analysis. This may be called a problem-solving skill that is a complex of literacy, numeracy, and data analysis. However, there are also non-cognitive skills such as communication, self-control to work proactively, and perseverance to move to new frontiers in adverse circumstances.

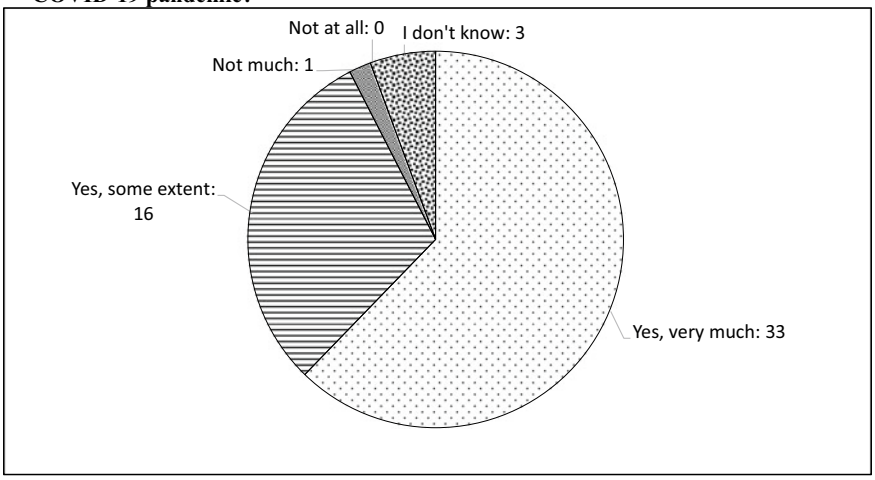
9.4.4 Impact of Kaizen *Activities on Digital Transformation*

Digital technologies are easily copied and expand quickly without degradation, while analogue technologies are time consuming to replicate and are degraded through copying. The changing nature of work under technological innovation demands that people develop ICT-related skills as well as non-cognitive/socio-behavioral skills. The combination of digital technologies by machine and analogue skills of humans

[8] African Union Development Agency (AUDA-NEPAD) and JICA have been organizing the Africa Kaizen Annual Conference under the framework of Africa Kaizen Initiative since 2017. Practitioners and policy makers in 8 to 12 countries participated in the conference in each year.

[9] Choices are 'yes-very much,' 'yes-some extent,' 'no-not much,' 'no-not at all,' and 'I don't know.'

(1) Answers to the Question 'Is *Kaizen* effective in overcoming challenges caused by the COVID-19 pandemic?'



(2) Multiple Descriptive Answers to the Question 'How does the *Kaizen*-type mindset influence coping with COVID-19?'

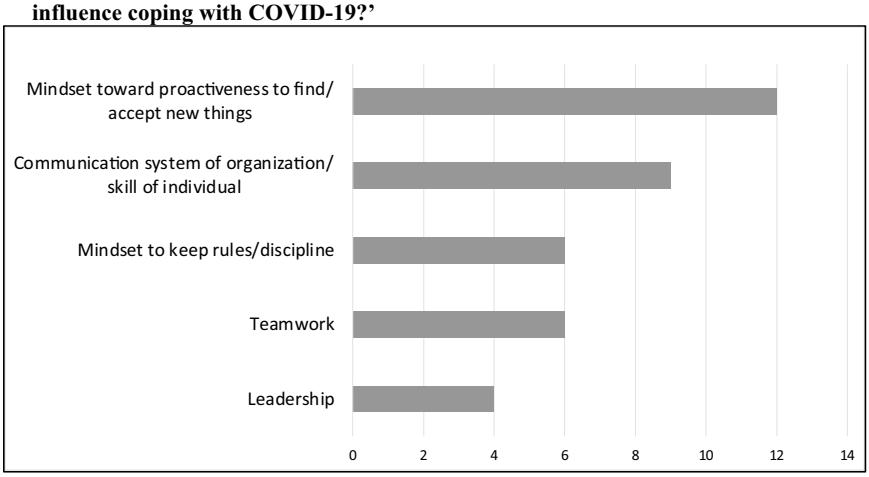


Fig. 9.1 Effectiveness of *Kaizen* Activities for COVID-19 Response (*Source* Elaborated by the author, based on the results of online survey at AKAC 2020)

will be the mainstream of job systems in the era of digital transformation. Digital technologies can accelerate the speed of change by using mass data and information while individuals' analogue skills can improve the quality of products and services through communication and customization.

If we interpret the above argument in the context of *Kaizen* promotion in developing countries, the cognitive skills relate to methods for utilizing ICT and AI in *Kaizen* processes, such as electric *Kanban*, digital inventory, remote monitoring

systems, wireless sensors to detect motion/mobility, and automatic inspection logs. The non-cognitive skills are those that cannot be replaced by ICT and AI because of the difficulty to measure, calculate, and simulate them by algorithms in digital technologies. These non-cognitive skills may create new jobs for people that can be a more human oriented in their value addition in combination with digital technologies, such as improving products/services based on feedback from customers to increase customer satisfaction and promote custom-made production.

For example, a possible story is furniture production. Banga and te Velde [4] suggest that the cost of manufacturing furniture with robots will become cheaper than that with labor in Kenya in 2033 and in Ethiopia in between 2038 and 2042. This means the craftsman in the furniture industry in these countries may lose their jobs if they cannot create further added value in furniture production. One possibility to respond may be made-to-order furniture based on customer requests and feedback. Currently most furniture available on the market is ready made. However, if communication networks are well developed, most furniture may be custom-made in order to add value to these businesses. The creation of these new ideas and values will rely on the social skills of workers that cannot be replaced by digital technologies but can be complementary to them. The actual creation of new products and services requires tireless trial and error efforts based on strong perseverance/grit. That is a reason why non-cognitive skills are more and more important in the digital era.

Other opportunities are created through the continued improvement of communication through mobile phone and internet. The development of ICT has been creating huge space for radical and disruptive innovations. It also promotes productivity in the service sector through improving connectivity. Service has a character of non-tradeable business because of simultaneity of the creation and consumption of service [29]. However, development of ICT drastically expanded its outreach to consumers, which improved the productivity of service. Communication technologies also increase opportunities to match consumers and service providers such as Uber. Therefore, the development of ICT is creating new job opportunities.

How *Kaizen* can be utilized in the context of such development of digital technologies? For ICT engineers, agile SCRUM is an interesting model for QPI by utilizing the concept and tools of TPS. Jeff Southerland promotes team activities through organizing short meetings called agile SCRUM and practices continuous improvement process in software development instead of using the waterfall model that is a linear sequential flow. This approach eliminates waste and impediments and strengthens customer orientation and feedback through continuous processes [41]. It also addresses the motivation issue through flat structure and autonomy. The case of SCRUM shows the effectiveness of *Kaizen* practices in development of digital technologies by modifying its tools along with the needs and circumstances of new business.

It is worth mentioning that Toyota Motor Co. strengthened its *Kaizen* suggestion system when it recognized a historic change in the automotive industry under a shift towards electric vehicles led by AI development and climate change. The board of Toyota in Japan requested all management staff in the head office to present at least one suggestion on *Kaizen* per month as a mandate in order to find appropriate ways to

adapt and overcome such changes.[10] In addition, although it is not directly related to digital technology, when Nissan was in debt crisis in 1999, Carlos Ghosn formulated cross functional teams (CFT) in the company and solved problems that enabled the V-shaped recovery of the company [43, 46]. These cases show the applicability of *Kaizen* in crisis situations.

Regarding the impact of digital technologies, the JIN Corporation interviewed a total of 37 companies in Ghana (22 companies) and South Africa (15 companies) using a questionnaire about firm behavior in the past and future (in the coming three years) [22]. The survey was conducted from late 2020 to early 2021, in the midst of the COVID-19 pandemic through remote connection. Managers of the companies responded that workers in their companies have been replaced or will be replaced by the introduction of digital technologies but not dismissed. The workers are assigned to new posts in the companies and perform new tasks. Because the utilization of digital technologies requires investment, almost all firms perform at higher productivity levels and expand their business activities. In this context, the digital technologies have a substitution effect for workers as well as complementary effects to expand businesses and create new jobs. However, the actual profitability of each company depends on competitiveness in the market of the respective products/businesses. If the company is highly competitive in the market and the market itself has room for further expansion, the company grows its own business. If the company is competing fiercely with other suppliers in the market, the company cannot expand its own business easily even after the introduction of digital technologies.

Under such circumstances, the company makes efforts to improve the quality of products to improve competitiveness or develop new products and enter into new markets. Through these efforts, most of the interviewed companies identified complementary effects between the digital technologies and job opportunities. In addition, most of the managers of these companies emphasize the importance of human resources development. Because of rapid digitalization, the companies increasingly want to secure highly skilled and experienced workers. Because the supply of such workers in the local labor market is not always sufficient, the companies want to keep their labor and develop their sense of belonging to the companies. Therefore, even under the COVID-19 pandemic, the managers sent messages to the workers that the companies care about them and that they will not be laid off [22].

These observations imply two issues in relation to *Kaizen*. One is the skill development of workers. Through *Kaizen* activities, workers are encouraged to acquire multiple skills, which are captured in a skill matrix that indicates the skills each worker has. Through multi-tasking based on multi-skills, workers can support the productivity performance of each task mutually and troubleshoot issues within the workplace. Such multi-tasking enables the adjustment of labor in response to the impacts of digitalization. Another issue arising from these observations relates to the nature of the bottom-up and participatory approach of such activities. Practitioners know that when *Kaizen* activities generate a surplus of workers through productivity improvements, management must not make these workers redundant, as this would

[10] Based on author's interviews with a staff of Toyota Motor Co. in October 2019 in Nagoya.

kill the motivation of workers and the sustainability of *Kaizen* activities. The more effective approach to saving labor is to pick out excellent workers from the production floor and assign them to more creative tasks [24, p. 107]. Thus, the *Kaizen* approach seems effective in accommodating the introduction of digital technologies.

9.5 Discussion

This section discusses implications drawn from the analysis on the cases described in Sect. 9.4. Although these points are based on the analysis of African cases, they may be able to extend to other regions and be considered common phenomenon of *Kaizen* activities.

9.5.1 Non-cognitive Skills Development Through Kaizen

Based on Zhou's [51] classification of non-cognitive skills that consists of perseverance/grit, self-control, and social skills, this subsection now discusses how non-cognitive skills can be developed through *Kaizen* practices.

First, social skills defined as the ability to establish compatible and effective relations with others and the ability to use appropriate social behaviors that are pleasing to others in interpersonal situations are reviewed. Although *Kaizen* is defined as the tools and methodologies for QPI, one of the essences of the approach is human resource development, as many practitioners and researchers point out [12, 17, 20]. Participatory practices that are incorporated into the tools/methodologies such as 5S and QC circle activities influence the development of social skills. The QC circle is a typical small group activity based on collective actions. The 5S process is also based on group work that starts by asking individuals to identify items to be disposed of but proceeds to discussion among the group on what item should be finally discarded. The process ends with developing consensus among participants on how to keep the workplace in good condition. Hence, through these practical experiences of group work and communication with co-workers, social skills can be developed.

Second, self-control is defined as the capacity to alter one's own responses, especially to bring them into line with standards such as ideas, values, morals, and social expectations, and to support the pursuit of long-term goals. This self-control may relate to the mindset argued by Dweck [8]. If we can change our mindset from a fixed one to a growth one, we can be more skillful with self-control. Among others, the suggestions system is one of practices that can influence the development of mindsets. Imai writes in the revised edition of his book *Gemba Kaizen* as follows:

> The *suggestion system* functions as an integral part of individual-oriented *kaizen* and emphasizes the morale-boosting benefits of positive employee participation. [...] They do not expect to reap great economic benefits from each suggestion. Developing *kaizen*-minded and self-disciplined employees is the primary goal. This outlook contrasts sharply with that of Western

> management's emphasis on the economic benefits and financial incentives of suggestion systems. [17, p. 10]

Imai's argument focuses on self-discipline and intrinsic motivation. Successful group work can strengthen the value of activities that contribute to the development of social skills.

Third, perseverance/grit can be disaggregated to passion and perseverance according to Duckworth [6]. She presents a Grit Scale that consists of 10 questions to measure one's grit and argues that the continuation of deliberate practices can strengthen grit. She added that there are two ways to strengthen grit: the first is by one's own tireless efforts and the second is by putting oneself in a group of people who have strong grit. Group work like the *Kaizen* approach can support one's efforts.

For adult workers, there are not many arguments on how to develop non-cognitive skills in practical ways. Although grit and mindset can be changed through efforts, the methodology to make such changes varies according to subject. And because these non-cognitive skills include social skills, it is important to create an enabling environment or group of people to mutually strengthen the efforts, as Duckworth writes, by quoting the sociologist Chambliss, 'use conformity—the basic human drive to fit in—because if you're around a lot of people who are gritty, you're going to act grittier' [6, p. 298]. She also writes, 'If you want to be grittier, find a gritty culture and join it. If you're a leader, and you want the people in your organization to be grittier, create a gritty culture' [6, p. 296]. This is similar to 'creating the attitude shared among all members of an organization who consistently pursue advanced levels of quality and productivity,' 20, p. v]. This implies written in the *Kaizen Handbook* [that *Kaizen*-type participatory practices or group work are effective in the development of non-cognitive skills.

9.5.2 Importance of Cyclical and Continuous Process

Because the success of *Kaizen* activities depends on participation and contributions of members of workplace, the question of the sustainability of the activities is always related to the motivation of members. Apart from extrinsic motivation enhanced by external rewards, stimulation of intrinsic motivation is more challenging issue. A high sense of self-confidence coupled with successful experiences may stimulate intrinsic motivation.

For *Kaizen* practitioners, the creation of tangible improvements in quality and productivity through group work is a stimulating factor. However, if we cannot create tangible improvements, the motivation/morale of members and the momentum of activities may be negatively affected.

Regarding the relation between motivations/morale and tangible outputs, cause-and-effect may be an arguable point. Clarification of causal relationships is one important component to analyze the root cause of problems. In a simplified understanding, high motivation and morale creates better outputs. However, this way of

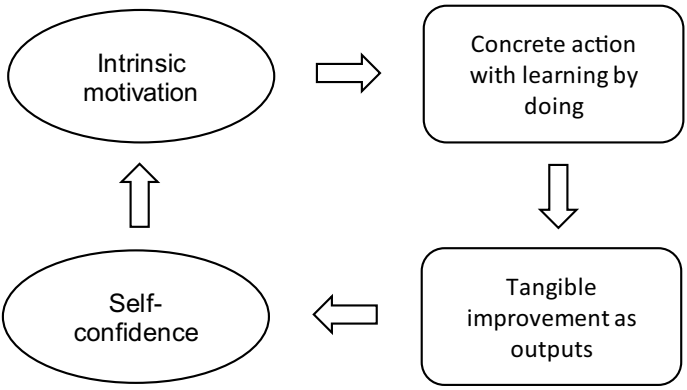


Fig. 9.2 Circular relation of motivation and outputs (*Source* Author)

thinking is sometimes oversimplified, illustrating only one side of the coin. It is also problematic for skill development because it does not address the issue of how to develop the intrinsic motivation of people. The reality is that successful experience also stimulates motivation through enhancing self-confidence. The author argues that motivation and results are in a circular relationship, much like the chicken and the egg, and they are mutually enforceable (see Fig. 9.2). There are many issues that we cannot understand through linear cause and effect relationships.

The relationship between poverty and environmental degradation is one such issue, as the *Report of the World Commission for Environment and Development: Our Common Future* states: 'Poverty is a major cause and effect of global environmental problems' [44, p. 19]. The relationship between motivation strengthened by self-confidence and the creation of tangible improvements through QPI is a similar issue. This circular relationship is one of the reasons why *Kaizen* is a continuous process. If we can strengthen our motivation by experiencing small successful results, this will be good start to the cyclical process of mutual reinforcement. And if we can have strong intrinsic motivation as Pink [37] argues, we can be proactive to make further actions. Therefore, a practical question is how we can strengthen both the motivation of people and the creation of tangible results of QPI.

Efforts to create change are always challenging compared with actions to maintain routine activities, a phenomenon known as status quo bias. We need additional power to create changes. Continuous implementation of small changes is a practical approach to encourage people to be positive because radical and drastic changes are not accepted easily.

In relation to the development of digital technologies, market demand and their related technologies keep changing. When we focus on a particular demand or product, we may adapt ourselves to specific technologies and skills. Adaptation can be one key strategies for success. However, we have to recall the words of an American organizational theorist that 'adaptation can preclude adaptability' [47]. When we achieve success in a particular niche or environment, we adapt ourselves to

such niche/environments and lose our adaptability in other environments. As Christensen notes in his famous publication *The Innovator's Dilemma* [5], when we have successful experience in one field, we may deepen our efforts to be more successful in the same field, which gives us a comparative advantage but deprives flexibility to change.

Under the current changing situation of technologies and global networks, we need to keep our adaptability while adjusting to new situations. Although it seems to be a trade-off, the continuity of *Kaizen* can be one of the answers to maintaining adaptability while adjusting actions. It can give us opportunities to review another market if we maintain a broad-enough view to adjust the overall situation and compete in the other market. This is highlighted in the *Kaizen Handbook*, which identifies one output of activities to be '(v) creating strong organizations that keep evolving and developing' [20, p. 1–1].

Using the concept of *Kaizen*, people can try many things to realize change for the better, and teams of such people will create organizational culture and develop into a learning organization. Therefore, if a company or organization can create a *Kaizen* mindset-type culture with continuous effort, the organization can become more resilient and adaptable to change. Continuity may ensure that the organizations maintain adaptability while adjusting to the new situation in the changing business environment. If society can promote *Kaizen* and elevate it as a broader movement, society may be able to develop into learning society.

9.5.3 Needs of Research on Kaizen *Activities*

We are currently in an age of change spurred by globalization, accelerated technology development, risks of pandemics, and the potential of geopolitical dynamism. We may need to adapt ourselves to the changing situation. Even approaches and tools of *Kaizen* activities and their priority may be changing. In fact, agile SCRUM is an interesting development of TPS in the context of the software industry in digital technologies.

Regarding team building in a company, Duhigg [7] reports on an analysis based on research of groups in Google. He points out that two behaviors are shared among good teams: (i) equality in distribution on conversation turn-taking, and (ii) high average social sensitivity. These are aspects known as psychological safety—a group culture of 'shared belief held by members of a team that the team is safe for interpersonal risk taking' [9]. This is also an interesting discovery of the value of *Kaizen* practices through research on team building in digital industry in the US.

On the other hand, there is analysis on the failure of *Kaizen* practices reported in Japan. The PDCA cycle is a basic management method of the *Kaizen* process. It is the simplest and most reliable approach among various tools and methods of *Kaizen* [20]. However, there is a risk of becoming a PdCa cycle according to Ikuya Sato. PdCa means that people spend a large amount of effort in planning but little effort in implementation, and focus a large amount of effort on checking, which becomes

micromanagement, while procrastinating on taking action [39]. We have to keep in mind that planning is easy, but implementation requires more effort, and checking is easy, but action is a challenge. If company management pours their own energy into planning and checking but ignores challenges in implementation and action, *Kaizen* is not materialized. This point relates to the importance for managers to work together with people in *Gemba* (factory floor) orientation and commit to a hands-on approach to create actual change.

Kaizen practices include group activities, such as QC circles and CFT, develop learning capacity among individuals including passion, ideas, values, and abilities to establish relation with others. Productivity improvement as their output may result from the collectiveness of work. However, it is not easy to measure and compare collective productivity with the sum of individual productivity. There are also some risk factors in the group approach that include (i) overpressure by group members or management; and (ii) group thinking that makes irrational decisions if pressure for harmony is overwhelming.

In this context, research on *Kaizen* is not enough to understand psychological and behavioral aspects in group dynamics/team activities that influence the motivation and skill development of individuals, hence productivity. *Kaizen* will be more effective through closer linkage with leadership. Styles of leadership that can be measured by Multifactor Leadership Questionnaire (MLQ) may be changing due to the development of communication technologies. Hence, research on leadership can also contribute to better performance of *Kaizen* practices. Although there are strong implications that *Kaizen* can contribute to advancement of non-cognitive skills development for adults, this needs to be further studied and analyzed. Results may be encouraging for adult workers who face challenges in the digital era.

9.6 Conclusion

The impact of *Kaizen on* the development of non-cognitive skills may not be so tangible at the beginning of its activities. However, using a continuous and cyclical process, non-cognitive skills can be strengthened so that people can become grit paragons as Duckworth pointed out. It is important to practice successful *Kaizen* repeatedly, which can cyclically strengthen motivation and self-confidence.

Mindset change is a low-hanging fruit, as the World Bank report says, because less physical investment is required. However, it is not stable because it is always influenced by the environment. That is why the creation of attitudes that can be shared among all members of an organization is important. The development of non-cognitive skills is a process to strengthen our capability to enrich the value of human relations (social skills), creativity and morale (self-control), and perseverance to achieve something, which are the essence of the philosophy of *Kaizen*. These human-centered approaches are gaining momentum and can be a concrete case

of practices that are advocated for within the concept of stakeholder capitalism.[11] Hosono mentioned that '*Kaizen* could be revisited from the perspective from these new initiatives,' referring to stakeholder capitalism in his closing remarks in the *Kaizen* seminar held in 2020 [15].

There are many proverbs and wisdom to encourage our challenging spirit, and enable us to maintain the perseverance and creativity necessary to break through the status quo. These include 'Kites rise highest against the wind' by Winston Churchill, 'In the middle of difficulty lies opportunity' by Albert Einstein, or 'Imagination means nothing without doing' by Charlie Chaplin. How we can enable ourselves and others to maintain such mindsets is an interesting dilemma for capacity building, social capability, and skills development.

How to measure non-cognitive skills development through *Kaizen* promotion is a point to be discussed further. Although we cannot measure the development of overall non-cognitive skills precisely, as Zhou pointed out, we can implicitly recognize the concrete improvement of individual skills when we experience *Kaizen* promotion in the workplace. We can also pick up specific skills and measure their development before and after implementing *Kaizen* while measuring the KPTs of business. The Grit Scale can be used to measure perseverance. And scales for teamwork and interpersonal communication in different academic disciplines are also available that can be modified to measure the impact of *Kaizen*.

Kaizen is a set of methodologies and tools to improve quality and productivity from the viewpoint of industry and the service sector. However, viewed from a different angle, *Kaizen* is a process of skill and capability development of people that is part of the process of career development and self-actualization. How we understand *Kaizen* depends on what we want to achieve through it. When we see the skill development of individuals achieved through its activities, we value not only the profit and success of our business or organization but also the wellbeing of individuals in contact with it.

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[11] The concept of stakeholder capitalism proposes that corporations should serve the interests of all their stakeholders including not just shareholders and investors but employees, customers, and the general public at large.

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Chapter 10
New Industrial Landscape: Implications for Industrial Policy and Japanese Industrial Development Cooperation

Toru Homma

10.1 Introduction: Background and Contemporary Mega-Trends in Industrial Development

Since the era of the First Industrial Revolution in the eighteenth and nineteenth centuries when steam-driven production methods were introduced and disseminated, industry has been continuously evolving [32]. The landscape of industrial development has again changed significantly in the first 20 years of the twenty-first century, with the emergence of distinct mega-trends such as globalization, digitalization, a series of unexpected large-scale external shocks including the Coronavirus Disease 2019 (COVID-19) pandemic and growing international concerns about the environmental and social impacts of development.

The shape of industry is also rapidly changing with new technologies, globalized production processes, and diversification of product needs coming to the fore. However, it is not clear how these changes affect the content and basic functions of industrial policy, as well as the process of its formulation and implementation in developing countries. We need to know what has been changing and what has not in industrial policy, in particular in developing countries. In this situation, Aiginger and Rodrik [2] point out a variety of trends that have contributed to renewed interest in industrial policy after a period of decline and summarize the general principles of this policy for the twenty-first century.

In seeking to answer these questions, this chapter first captures the mega-trends of industrial development that have become clear in the first 20 years of the twenty-first

This chapter is based on Homma [12], with updated information and additional research in new case studies.

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century and discusses related industrial policies and development partner intervention. It then examines the challenges and opportunities for developing countries in the face of contemporary mega-trends and how industrial policy should/would change in association with such trends. This is followed by a concrete case study of the automotive sector. Finally, it concludes with some lessons for the future of industrial policy and draws implications for Japan's industrial policy support to developing countries. While the chapter mainly deals with the manufacturing sector, the analysis is not necessarily limited to that sector, depending on the nature of each topic. As the manufacturing sector itself is also evolving as a result of on-going changes, the chapter takes a broader perspective which can be described as 'manufacturing and beyond.'

To provide the background for the chapter, the rest of this section summarizes four mega-trends around industrial development: (i) globalization; (ii) digitalization; (iii) global external shocks including COVID-19; and (iv) the growing environmental and social concerns about industrialization (see Table 10.1).

The first mega-trend is globalization. In the last two decades or even in the last two centuries, globalization has been going on in various ways and has accelerated further recently. Technological progress and the resultant dramatic increase of affordable transportation and communication means have contributed to advancing globalization. From the industry viewpoint, the emergence of global value chains (GVCs) is one of the most significant structural changes involving developing countries. The evolution, diversification, and fragmentation of GVCs provide a great number of opportunities for developing countries to penetrate international production networks with huge global markets. The promotion and facilitation of foreign direct investment (FDI) and international trade is however required to enhance GVCs. To reduce the barriers for international trade and investment among countries, a large number of Free Trade Agreements (FTAs), Economic Partnership Agreements (EPAs), and Bilateral Investment Treaties (BITs) have been established. Industrial policies to cultivate the fruits of globalization have also been further activated and expanded to achieve export-oriented and FDI-led industrialization. Meanwhile, globalization incorporating GVCs, FDI, and FTAs may also create the risk of developing countries being left behind through global competition.

The second mega-trend is digitalization. The rapid evolution of electronic technology and the consequent emergence of information and communications technology (ICT) have dramatically changed the shape of industries in the world, in both developed countries and developing countries at the same time. Several innovations,

Table 10.1 Major contemporary mega-trends around industry discussed in this chapter

	Globalization	Digitalization	Global external shocks	Environmental and social responses
Typical keywords	GVCs, FDI, FTAs	ICT, DX, 4IR, I4.0, IoT, AI	COVID-19, Pandemics, Disasters, Crises	SDGs, Green growth, Carbon neutral

Source Elaborated by the author based on Homma [12]

new industries, and epoch-making business models as represented by the global giant platforms have been emerging. Existing industries have also been experiencing significant changes through digital transformation (DX). Digitalization has a strong power to transform industries in the world and has resulted in significant transformation up to the level of a revolution. This is the Fourth Industrial Revolution (4IR), and it is based on networked virtual production systems, represented by Industry 4.0. It is associated with up-to-date technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), robotics, 3D printing, and big data. It will have significant impacts in the next decade, although industrial policies to utilize this new trend are still under-developed, especially in developing countries. For example, digitalization provides significant and wide opportunities for developing countries and startups in the world to utilize digital technology at an affordable cost and sometimes create more advanced businesses than developed countries and established industries. This is because developing countries may be able to offer flexible opportunities for proof of concept (PoC) of new businesses and new technology applications due to their abundant social needs and their less rigid regulatory frameworks. There is also the chance that innovations born in developing countries can flow back to developed countries and spread in their markets. These phenomena are often described as leapfrogging and reverse innovation.

The third mega-trend is global external shocks as exemplified by the COVID-19 pandemic. Industry has been heavily hit by global-wide unexpected external shocks irregularly during the past 100 or so years. The latest large one is COVID-19, which was declared as a pandemic in March 2020 and the world is still fighting against this extra-ordinary large-scale disruption as of 2022. Even though their impacts were less than those of COVID-19, several other epidemics have also affected human lives and industries in the last two decades (for example, SARS, Avian Flu, Swine Flu). Furthermore, there have been other unexpected external shocks with strong negative impacts. These include natural disasters such as earthquakes with tsunami, cyclones/hurricanes/typhoons, floods/landslides, forest fires, and conflicts and wars such as the one in Ukraine by invasion of Russia in 2022. Other unexpected external shocks that need to be considered are the economic ones. The largest of these in the last two decades was the 2008 global financial crisis.

All these unexpected external shocks have tremendous negative impacts on industries in developing countries from both demand and supply sides. At the same time, they create unique opportunities for new industries and innovative businesses. From the policy aspect, measures to ease pain and assist their survival are immediately needed and must be provided; but later more positive policies to nurture new industries and innovative businesses should also be considered. Finally, policies to strengthen the resilience of industries may be introduced to allow for future unexpected external shocks.

The fourth mega-trend is the growing environmental and social concerns about industrial development. Sustainable and inclusive development objectives are becoming mainstream not only in the international development community but also in the private sector, especially after the Sustainable Development Goals (SDGs)

were adopted at the United Nations General Assembly in 2015 and disseminated around the world. The four mega-trends are summarized in Table 10.1.

The remaining sections of this chapter focus on each of these mega-trends and add an exclusive section for a case study of the automotive sector and a final concluding section. These mega-trends do not necessarily exist alone, they are closely interlinked. For example, COVID-19 accelerates digitalization, GVC sophistication and environmental/social-friendly enhancement; and digitalization provides solutions to COVID-19 and GVC networking.

10.2 Renewed Interest in Emerging Global Value Chains (GVCs)

10.2.1 Overview of GVCs

The Organisation for Economic Co-operation and Development (OECD) [29] describes GVCs as being 'where the different stages of the production process are located across different countries.' Inomata [18, p. 36] defines GVCs as production and consumption networks in the global game to create and distribute values. The theoretical framework of GVCs has been conceptualized based on accumulated works such as those of Gereffi et al. [6] who identified the five types of GVC governance as hierarchy, captive, relational, modular, and market. Recently evidence-based research has been attempting to recognize how GVCs work in the developing country context. The World Bank [36] *World Development Report 2020: Trading for Development in the Age of Global Value Chains* suggests that GVCs powered the surge of international trade after 1990 and they now account for almost 50% of global trade. The Bank suggests that GVCs have helped poor countries grow faster over the past 30 years and a 1% increase in GVC participation is estimated to boost per capita income levels by more than 1%, which is almost twice as much as conventional trade.

One of the most significant concepts behind GVCs is 'fragmentation,' which means specialization of the various production processes in multiple countries. This fragmentation allows developing countries the opportunity to participate in part of a GVC without having a full set of production capabilities. In this regard, value chain management through the initiative of multinational enterprises (MNEs) throughout the whole process, and the network infrastructure such as transportation and communication channels, becomes important.

GVCs are composed of chains of value-added processes from upstream to downstream around the core production process, such as research and development (R&D), design, logistics, production, distribution, sales, and services. Generally, there is a tendency for value added in the core production process to decrease while value added in the upstream and downstream processes increases over time. Along with such tendencies, how developing countries associate with this 'servicification' of the

manufacturing process [7] is important because they need to avoid the 'race to the bottom' in lower value-added production processes and can secure more benefits from higher added value processes in the upstream and downstream of GVCs.

10.2.2 Industrial Policies in Developing Countries in Relation to GVCs

The World Bank [36] suggests that national policies can boost GVC participation. More concretely, GVCs can continue to be a force for sustainable and inclusive development if developing countries speed up trade and investment reforms and improve connectivity, but at the same time only if advanced economies pursue open and predictable policies. It also suggests renewed interest in GVCs due to their larger contribution to growth as follows: 'In contrast to the "standard" trade carried out in anonymous markets, GVCs typically involve long-term firm-to-firm relationships. This relational nature of GVCs makes them a particularly powerful vehicle for technological transfer along the value chain. Firms have a shared interest in specializing in specific tasks, exchanging technology, and learning from each other' [36, p. 70].

For developing countries to pursue trade and investment reforms and improve connectivity for better GVC ecosystems, a standard policy menu for investment and trade promotion and facilitation is required, including trade/investment regulatory reform for further liberalized and simplified ecosystems, capacity development of investment/trade promotion agencies, hard and soft infrastructure improvement, special economic zone development, and customs reform. In other words, a broad-based 'horizontal policy' is indispensable. Also, policies for securing GVC benefits for developing countries need to be considered. These GVC benefits include: (i) job creation; (ii) technology transfer (typically from MNEs to local partners); (iii) capital inflow; (iv) backward linkage establishment; and (v) spillover effects in the local economy.

As the GVC's nature is fragmentation and they offer selective participation in certain industries, policy to set priority industries may also be needed. In other words, 'vertical policy' focusing on a specific industrial sector is significant. At the same time, fragmentation suggests that there is much room to have divestment if a host country that participates in a particular segment of a GVC does not maintain or improve the advantages for footloose type investors. For example, wage standard setting is quite important but requires sensitive policies to balance securing job welfare for people while maintaining competitive labor costs for investors.

Thus, while GVCs provide wide opportunities for developing countries to earn the benefits mentioned above, there is also a risk that developing countries may be left behind in global competition if they cannot secure a position in the global production network. Developing countries should not rely heavily on the benefits brought by the GVC leaders such as MNEs; they should also put further effort into their industrial

policies to grow local industries potentially linked with the GVCs. Regarding FDI-based GVCs, a country is not in a position to choose those GVCs; rather, FDI or GVC lead firms are in a position to choose countries.

10.2.3 Donors' Intervention in GVC-Related Industrial Policy

Donor intervention in GVC-related industrial policy has been evolving in response to the rise of GVCs in developing countries. The Japan International Cooperation Agency (JICA) has been working on GVCs in developing countries by assisting supporting industries (parts and component industries), especially in the second tier and third tier in the pyramid of the automotive industry under car manufacturers. Having a careful look at firm-to-firm relationships in the GVCs of the automotive industry, JICA has been conducting technical cooperation in Thailand, Indonesia, Philippines, Mexico, and South Africa. Katai [24] finds some evidence of a positive relationship between GVC lead firms' evaluation of quality/cost/delivery (QCD) levels and the supplier firms' position in GVCs in Mexico. This is good evidence to support the importance of firm-to-firm relationships, as mentioned in the World Bank report [36]. The report suggests that 'firm-to-firm relationships' are a distinct feature of GVC-based trade compared with traditional trade. Meanwhile, as suggested above, investment reform is an integral part of industrial policy related to GVCs. JICA has been supporting investment reforms in many countries but mainly in Southeast Asia, South Asia, Africa, and Eastern Europe. Parts of this JICA support are quite comprehensive and include dispatch of an investment promotion policy advisor to its investment promotion agency (IPA), support for investment policy reform with long-term investment promotion plan development, legal/regulatory framework upgrades, capacity building of IPAs, investment climate reform, special economic zone (SEZ) development, economic infrastructure development, public–private partnership frameworks, and so on.

For more deeply related intervention in GVCs, JICA implements technical cooperation on selected industries that rely on GVCs, such as in the automotive and electric/electronics industries, and in some countries such as Indonesia and the Philippines. In cooperation with these countries, GVC analysis is conducted (see Fig. 10.1). This shows local parts makers are involved in the production process together with auto makers; but in other upstream and downstream processes, they are less involved, and value is not added locally. Furthermore, in the case of Indonesia, the JICA study team assisted the secretariat for inter-ministerial coordination on industrial policy to provide hands-on policy inputs including the good practices of neighboring countries in response to actual needs. This hands-on support, which corresponds to 'translative adaptation processes' [31], was welcomed and created some successes such as the realization of a new tax incentive scheme for accelerating R&D and human resource development for several designated industries including the automotive industry.

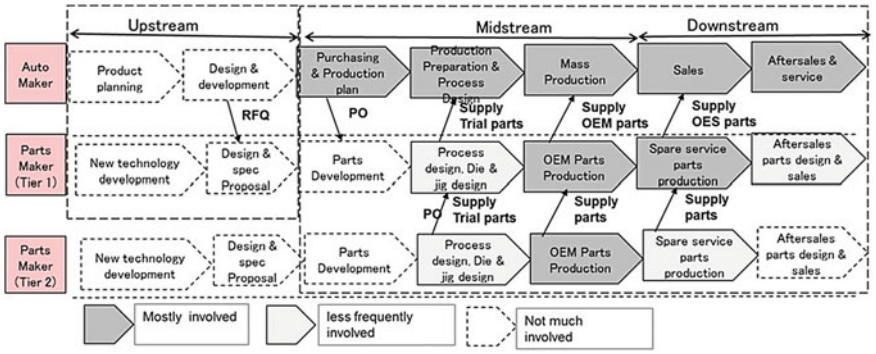

Fig. 10.1 Status of GVCs in the Automotive Sector in Indonesia (*Source* JICA and NRI [22]. *Abbreviations* Original Equipment Manufacturer [OEM]; Original Equipment Supplier [OES]; Purchase Order [PO]; Request for Quotation [RFQ])

Subsequent to these recent attempts to support GVCs, the nature of JICA's intervention has been changing. First, JICA's intervention is widening from a focus on production process in global supply chains to include those out-of-production processes that add more value, such as R&D, design, and affiliated services. Second, the target of its intervention is expanding from isolated individual parts manufacturing small and medium-sized enterprises (SMEs) to more structured groups involving both the parts/components local industries and the assemblers of the finished product.

As pointed out earlier, the World Bank has adopted GVCs as their main topic [36], and the OECD has been pursuing GVCs and conducting international research projects. The Donor Committee for Enterprise Development (DCED) collects donor interventions in value chain development and shows that many European donors focus more on GVCs in the agro-processing industry, while Japan focuses more on the automotive industry. DCED [5] also shows that the activation and appropriation of market mechanisms, logistics improvement, actor analysis, environment and social considerations, and Corporate Social Responsibility (CSR) are the key elements of donor interventions related to GVCs in developing countries.

10.3 Industry 4.0/Fourth Industrial Revolution

10.3.1 Overview of the Fourth Industrial Revolution/Industry 4.0

The Fourth Industrial Revolution (4IR) is recognized as introducing 'smart applications that integrate virtual and physical production systems,' following the First Industrial Revolution (1760–1900) that pioneered the use of steam and mechanically driven production facilities, the Second Industrial Revolution (1900–1970) that was

based on mass production driven by electricity and the division of labor, and the Third Industrial Revolution (1970–present) that brought extensive use of controls, information technology, and electronics for an automated and high-productivity environment ([1], based on [32]).

The term Industry 4.0 is sometimes used interchangeably with the term 4IR. The idea of Industry 4.0 (Industrie 4.0 in Germany) was established in Germany around 2013 through the initiatives of German manufacturing and other industries backed by the government. Putting the IoT and Cyber Physical Systems (CPS) as its core, Industry 4.0 harnesses the three concepts of connecting, replacing, and creating to achieve more efficient production and productivity improvement [28]. The United States (US) followed the German movement, and the Industrial Internet Consortium was created.

A World Bank publication by Hallward-Driemeier and Nayyar [7] shows that the top 10 technologies associated with Industry 4.0 are: IoT, big data analytics, 3D printing, robotics, smart sensors, augmented reality (AR), cloud computing, energy storage, AI/machine learning, and nanotechnology. Utilizing such digital technologies, the idea of 4IR/Industry 4.0 is being tested and/or has already materialized in global industry.

Although these trends originated in developed countries, developing countries, in particular relatively advanced ones, are also getting involved in Industry 4.0. Mischke [27] demonstrates that developing economies are beginning to close the gap through rapid adoption of new technologies starting from a low base as shown in the growth of the Country Digital Adoption Index. Some of the technologies with Industry 4.0 such as AI have become more easily available even in least developed countries such as those in Sub-Saharan Africa. On the other hand, close to 50% of tasks could be automated by 2030, affecting 760 million workers in emerging economies [27]. The digital divide, which currently means four billion people in the world being outside the digital economy, may become more serious especially in developing countries. It is thus important to analyze the pros and cons of the impact of 4IR on the future of developing countries.

10.3.2 Industrial Policies in Developing Countries in Relation to Industry 4.0

In response to the rapidly growing interest in 4IR in western countries, several countries in Asia have been trying to accommodate this movement into their respective national policies. In 2015, China set forth ‘Made in China 2025,’ which is based on innovation of manufacturing as a target using digital technologies. In 2016, Japan advocated the concept of ‘Society 5.0’ in its science and technology plan as the cyber-physical integrated social system for human-centered society that fully utilizes IoT, AI, and robotics to provide solutions. Society 5.0 is considered as the next

society following Society 1.0 (hunting), Society 2.0 (agriculture), Society 3.0 (manufacturing), and Society 4.0 (information). It is considered that Japanese industry has strength in 'integral architecture' when manufacturing products are built from many parts with optimal adjustment thanks to its technological capability. However, 'modular architecture,' which is the simple assembly of units with less coordination than the 'integral architecture,' is becoming more mainstream in the global digitalization era [25]. Japan needs to reconsider how to survive in the era of 4IR with digital technology and a systemic approach.

Meanwhile, several Southeast Asian developing countries have published national industrial policies inspired by Industry 4.0. These include 'Thailand 4.0' in 2015, 'Making Indonesia 4.0' in 2018, and 'Malaysia's National Policy on Industry 4.0' (Industry 4WRD) in 2018. While these policies have the contents and flavor of Industry 4.0, they are considered as updated versions of more comprehensive national industrial policies.

These policies demonstrate the positive impacts of Industry 4.0 as a key driver to create innovation, raise efficiency, and improve the productivity of industry. However, negative concerns such as job opportunity loss due to the introduction of up-to-date automation technologies, and safety and data security issues caused by the new technologies, tend to be left out of their consideration. The DCED Annual Conference held in 2019 discussed Industry 4.0 as its main topic on private sector development in the age of digitalization. The conference summarized great opportunities for developing countries' development through innovation in the private sector including startups geared by digitalization and Industry 4.0 type technologies. At the same time, it voiced concerns about the possible negative effects on job markets caused by AI and automation and stressed the need for education and vocational training to meet the emerging requirements for digital skills. The United Nations Industrial Development Organization (UNIDO) suggests that 4IR technical cooperation including convening/awareness raising, road mapping and policy advice, readiness analysis and Industry 4.0 observatory, demonstration, learning and innovation centers, Industry 4.0 absorptive capacity building, and international twinning [26] should be made available to developing countries.

Essentially, renewed industrial human resource development should be the key in developing countries. Advanced Southeast Asian countries such as Thailand, Malaysia, and Indonesia are already faced with rapid increases in the cost of labor and the emerging necessity for accelerating automation and factory IoT [22]. Industrial human resource development is needed to support human resource shifts from simple labor-intensive workers to advanced technological engineers. In any developing countries including those in Sub-Saharan Africa, there is also increasing demand for fostering entrepreneurs who can start digital technology-driven businesses using AI, IoT, and big data. But this requires earlier education and training in advanced ICT. Industrial policy should accelerate this dynamic shift of industrial human resources by providing learning opportunities for digital technology/system engineering at higher education or technical and vocational education and training (TVET) level, and the skill development opportunities for technicians in

industry, and by establishing a fiscal/non-fiscal incentive framework for enhancing such opportunities.

10.3.3 Japan's Possible Intervention in Industry 4.0

Industry 4.0 is still new even in Japan, particularly in its technical cooperation with other countries. Under such a situation, what can Japan or JICA contribute to adding value in this area? JICA conducted a 'Data Collection Survey on Upgrading Manufacturing Industry using the Latest Technology' in 2019–2022 with some field surveys in target countries such as Thailand, Vietnam, Indonesia, Malaysia, and Myanmar, as well as literature surveys of benchmark countries such as Germany, the US, China, India, and Japan. The survey's purposes are: (i) analyzing the impact of rapidly advancing new technologies in industrial development; (ii) mapping out the current situation of Industry 4.0 in selected Asian countries; and (iii) proposing plans for the cooperation program of JICA in this area [21].

The survey found that the industries in the target countries are generally not fully equipped to accommodate Industry 4.0 developments such as IoT. Nevertheless, it has identified some trial cases and potential needs. The survey also found that Industry 4.0 has an affinity with *Kaizen*,[1] which: (i) has the distinct feature of data visualization (for example, visualized data chart posted in each factory shop floor to be shared among the staff in Quality Control Circle: QC Circle); (ii) originates from statistical quality control; and (iii) is fairly well disseminated in the surveyed Southeast Asian countries [9]. JICA et al. [21] also suggest that 4IR is something that should be implemented based on the foundation of *Kaizen*, otherwise redundant processes would be brought into digitalization and the IoT network, preventing efficient realization of 4IR. Figure 10.2 illustrates 3 steps/criteria to achieve advanced manufacturing or 4IR including (i) data driven, (ii) digitalization, and (iii) connectivity (network), and *Kaizen* works on the transition from being data driven to digitalization. It is suggested that *Kaizen* has 'renewed value' in the Industry 4.0 and digitalization era. Furthermore, Japan may have a comparative advantage over other countries in certain areas of manufacturing industries, in particular robotics and factory automation where hardware technology and software technology are fully integrated. These areas could be prioritized and promoted.

As was shown previously, Industry 4.0 is still new from a viewpoint of technical cooperation. While there is a great potential for Japan to contribute to this area, it has not yet developed policies to make this future concept a reality. Therefore, it seems that a co-learning and co-creation approach is needed and is suitable rather than the traditional type of one-way technology transfer. It should be appropriate

[1] *Kaizen* is an inclusive and participatory approach to the continuous improvement of quality and productivity, resting on a distinctive philosophy and tools/methods. It forms the basis of multiple management systems, including TQM and TPS, developed in Japan and adapted for use in other countries [14].

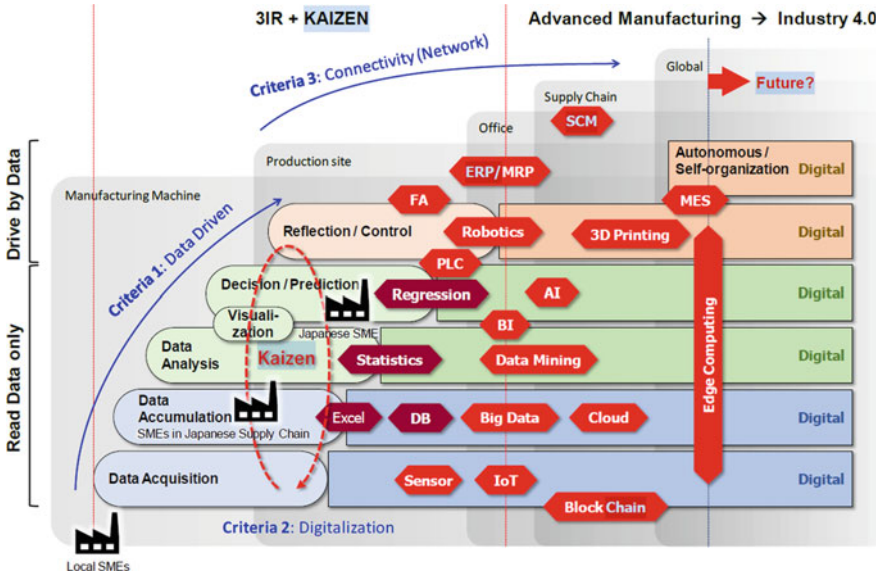

Fig. 10.2 Roadmap Towards Advanced Manufacturing and 4IR and Status of Elemental Technologies, Featuring the Function of *Kaizen* (*Source* JICA [21]. *Abbreviations* Business Intelligence [BI]; Database [DB]; Enterprise Resource Planning [ERP]; Factory Automation [FA]; Manufacturing Execution System [MES]; Materials Requirements Planning [MRP]; Programmable Logic Controller [PLC]; Supply Chain Management [SCM])

for Japan and host developing countries to think and learn together about how to accommodate Industry 4.0, utilizing a hands-on approach with a problem-solving methodology such as *Kaizen*.

10.4 COVID-19 and Industrial Development

10.4.1 Overview of the COVID-19 Pandemic

The World Bank [38, 39] suggests that world real GDP growth in 2020 was -3.5% and that COVID-19 is likely to cause a global recession whose depth is surpassed only by the two World Wars and the Great Depression over the past century and a half. World trade volume decreased by 8.3% in 2020 compared with the previous year. The International Labour Organization (ILO) [17] confirms the massive impact that labor markets suffered in 2020 with 8.8% of global working hours being lost in the whole of last year (relative to the fourth quarter of 2019), equivalent to 255 million full-time jobs or approximately four times greater than the number lost during the 2008 global financial crisis.

In a nutshell, industry in the world has heavily suffered from COVID-19 through a massive economic slump, huge demand losses, trade volume losses, liquidity losses, job opportunity losses, and difficulties in access to finance. Developing countries of course faced all these problems even before the COVID-19; but the picture has become worse, up to a fatal situation, due to COVID-19. The ILO [16] reveals that enterprises in the surveyed developing countries claim they stopped operations due to COVID-19 (70% of respondents), experienced a shortage of cash flow (86%), and received less than half the number of orders compared with before-COVID-19 (33%). Furthermore, GVCs were damaged and/or interrupted due to massive lockdowns affecting national borders and factories, less human mobility, a mismatch in demand and supply, a logistics slump due to demand loss, and concern for the rise of protectionism as against free trade regimes. Thus, the benefits of GVCs for developing countries have deteriorated.

On the other hand, this unprecedented global crisis also provides positive impacts for industry. First, extra-ordinary immediate demands are created for certain products; in particular, medical products such as masks, gloves, personal protective equipment (PPE), and ventilators. Second, digitalization and DX have accelerated to meet the huge demand for remote working, contactless procedures, and automated production. Third, a wide variety of new technologies called 'Corona-Tech' are being rapidly developed, especially by startups, to solve the huge social issues created by COVID-19. Fourth, due to the interruption of GVCs and general trade, local production with tailor-made technology and home-grown solutions is being enhanced.

10.4.2 Policy Support in Response to COVID-19

The world is being forced to devote massive resources to alleviate the negative impact caused by COVID-19. The World Bank [37] suggests a three-stage investment climate policy support in response to COVID-19: (i) relief; (ii) restructuring; and (iii) resilient recovery. Initially, immediate action is required to mitigate shocks and short-term financial schemes should be provided for mainly SMEs and for job security. The ILO [16] reveals that enterprises in the surveyed developing countries need support in the form of business continuity advice (50% of respondents), advice on export and logistics restrictions and requirements (38%), and other information. In the restructuring stage, policy support for restoring their businesses and accelerating their reopening through policies to enhance demand are required. Finally, in the resilient recovery stage there is a need to secure a firm foundation and 'build back better.'

JICA has formulated a framework for supporting its private sector development (PSD) program in response to COVID-19 [23], cited in [10]. This framework identified four major consequences of COVID-19 in relation to PSD, namely: (i) lost cash flow; (ii) damaged supply chains; (iii) emerging demand for medical/sanitary products and business continuity/contingency planning (BCP) of local SMEs; and (iv) demand for a 'new normal.' In response, JICA has been providing: (i) emergency

financial support; (ii) support for supply chain rebuilding by business development services (BDS) and new technology; (iii) support for BDS/*Kaizen*; and (iv) innovative startup support.

One such example to associate with the above (iv) is JICA's startup support overarching program, called Project NINJA, which stands for 'Next Innovation with Japan.' One of the achievements of Project NINJA is a business contest in 19 African countries to provide support for startups and the acceleration of new businesses in response to COVID-19, such as remote medical services, infection information delivery, remote business/education tools, online sales, logistics/delivery systems, and other Corona-Tech-based business. It supports proof of concept (POC) for the winners for their business ideas and had attracted 2,713 applicants from 19 African countries by August 2020.

Each donor agency has created a COVID-19 specialized website. DCED created one of the fastest knowledge portals on its website called 'Private Sector Development and COVID-19,' immediately after the pandemic declaration in March 2020. The portal provides useful content such as: (i) information on socioeconomic impacts and national responses; (ii) how to adjust PSD interventions in the short term (a greater focus on: (a) conducive investment policies/procedures; (b) tax relief or other measures to ease the financial burden on businesses; and (c) digitalizing administrative procedures); (iii) promoting economic recovery and resilience; and (iv) building agency knowledge portals, statements, and funding activities.

In the area of investment promotion, in response to COVID-19 and a sharp decrease in newly announced greenfield investment due to economic turmoil and moving difficulties, many investment promotion agencies (IPAs) in the world have attempted to tackle this situation. In the initial phase of COVID-19, IPAs were required to take care of existing investors to secure their businesses by facilitating their daily activities which were heavily affected by the COVID-19 pandemic by, for example, labor management, visa extension for home country staff and other immediate means. In the next phase of the pandemic, fresh greenfield investment is still difficult. But, as a short-term measure, IPAs might consider working with some of the existing investors who have already roots in the host country and are interested in reinvestment or investment extension to capture rapidly growing demand for certain commodities and provide home-grown solutions to address cross-border trade difficulties. After surviving these phases, IPAs could consider, as mid-term measures, greenfield investment attraction for those who seek business information on a remote basis.

A JICA project in support of investment promotion in Bangladesh has been taking these staged approaches. The previously mentioned 3-step phased approach of the World Bank Group [37] (relief, restructuring, and resilient recovery) is based on a similar idea. It is also important to identify priority investment sectors in the light of new demand in the era of COVID-19 and beyond. It is also useful to identify strategically important sectors that may have a larger impact on people's lives but need emergency assistance from the government. The JICA investment promotion project in Bangladesh provides analysis and suggestions for identifying such investment sectors [11].

Meanwhile, JICA's *Kaizen* project in Tunisia produced a video clip[2] that summarizes how *Kaizen* can contribute to the response to COVID-19 through work environment improvement (see Chap. 7 for a description of the *Kaizen* project in Tunisia). JICA's cooperation 'Japan Center'[3] in several Asian countries also created e-learning materials on how to sustain the on-going business through *Kaizen*, management strategy and human resource management.

10.4.3 Resilience and Future Pandemic and Other Challenges

As discussed in the above, COVID-19 has been one of the heaviest shocks in the present century but similar pandemic and other unexpected external shocks including natural disasters may attack industry again in the future. At the same time, there are some new positive opportunities for the future such as Corona-Tech. What is required in preparing for such anticipated events is to enhance the resilience of industry. To strengthen resilience, the recovery process is quite critical. Many donors call for 'build back better,' which is exactly suited to the purpose of strengthening resilience. The Europian Union (EU) has set policy on green recovery for this stage to realize 'build back better.' It is crucial for the world including developing country governments to draw-up comprehensive recovery plans involving various sectors horizontally and deepening each sector vertically. In a nutshell, the COVID-19 experience shows that industrial policy in developing countries needs to take this opportunity to accelerate transformation in the short run, and to strengthen the resilience of industries in the long run.

[2] See the video 'Kaizen against Covid-19 infection: Testimonies from CEOs in Tunisia' (https://www.youtube.com/watch?v=s0FK8hot9LI).

[3] JICA has been supporting 10 'Japan Centers' in nine countries, offering three main programs based on: (i) business courses, (ii) Japanese language courses, and (iii) programs to promote mutual understanding.

10.5 Environmental and Social Response in Industrial Development

10.5.1 Overview of the Environmental and Social Response in Industrial Development

The role of industry in contributing to the SDGs and supplying solutions for environmental and social issues is increasingly attracting attention as Aiginger and Rodrik [2, p. 191] note: 'an increased focus on societal and environmental goals is necessarily raising questions about industrial policy as it shapes the structure of economic activity more generally.' The need to address the SDGs is more significant in developing countries involving the local private sector. Global financial flows also pay attention to these trends, for example, emerging impact investment and Environment, Social and Governance (ESG) investment. These influence not only developed countries but also developing countries through the behavior of globally operating MNEs and GVCs. Venture capital has been growing to supply seed money and beyond for startups, which contribute to solutions for social and environment issues and operate in developing countries. A green industrial revolution is going on in response to the pressing need to create decarbonized society. Green industry is not only for anti-pollution and renewable energy, but it is a conceptual change in any industry designed to create an efficient and green society. Industrial policies need to address these various dynamic changes in relation to environmental and social concerns and to contribute to quality industrial development in the next few decades. OECD has been working on the 'FDI Qualities Initiative,'[4] which addresses sustainable investment promotion and launched FDI Quality Indicators in 2019, FDI Qualities Policy Toolkit in 2022 and FDI Qualities Guide for Development Co-operation Policy in 2022 [30].

10.5.2 Environmental Consideration in Industrial Development

As already noted, careful consideration needs to be given to anticipated environmental consequences caused by industrial economic activities. Growing concern over the possible negative impact and risk mitigation efforts is foreseen in industry globally. On the other hand, there is also a new business opportunity in tackling these concerns and risk alleviation needs.

Under such circumstances, a keyword which combines both ideas of environmental consideration and industrial development is 'Green Growth.' DCED [5] describes Green Growth as 'Many private sector development (PSD) programmes

[4] The OECD identifies the following four areas as the key indicators for the quality investment: (i) productivity and innovation, (ii) job quality and skills, (iii) gender equality, and (iv) de-carbonization.

aim to achieve economic as well as environmental goals, including the mitigation of, and adaptation to, climate change, the reduction of pollutants, and a reversal of biodiversity loss and water scarcity. Meeting these needs can also be an opportunity for businesses in the developing world.' Meanwhile, the Japanese government declared 'Carbon Neutral in 2050' to be national policy and in response developed the 'Green Growth Strategy' as an industrial policy to be associated with the 'virtuous cycle of economy and environment.' This aims to transform the basic idea that global warming mitigation is just a hindrance and cost into a more positive approach to revolution and future growth. It also suggests that there is support for Asian emerging economies for de-carbonization.

10.5.3 Social Consideration in Industrial Development

There is growing interest in pursuing both social consideration and economic development in investment. For such purposes, Impact Investment is attracting interests in development community as an investment activity to try to solve social and environmental issues at the same time with pursuing financial benefits, according to the Global Steering Group for Impact Investment (GSG). The size of the global Impact Investment market was estimated to be 500 billion USD in 2019 according to the GSG.

Startup business and entrepreneurship support is also a rapidly growing area in industrial development, as a quite active approach to fully use the startups' dynamism and power to solve social challenges that people in developing countries face in their lives. The above mentioned JICA NINJA Project is one such approach to co-creating solutions for social issues.

10.6 Case Study: The Automotive Industry

This section provides a case study focusing on the automotive industry as a giant industry of approximately three billion USD in global market terms producing some 78 million cars to meet global annual demand. As such, it is an industry with transformative industrial development potential (see Chap. 2). The automotive industry is also heavily affected by the contemporary mega-trends presented in the earlier sections of this chapter such as GVCs, Industry 4.0, COVID-19, and environmental/social considerations. Furthermore, the industry is at a juncture of drastic change in its electric vehicle (EV) and de-carbonization responses to the climate change problem. COVID-19 has also affected the automotive industry from both the demand and supply sides. Especially the challenges on the supply side highlight the necessity for resilience in the global supply chain.

Meanwhile JICA has been conducting various technical cooperation for automotive industry promotion in several developing countries that have the automotive

industry and its supporting industries (parts and component industries). This section first summarizes JICA cooperation for automotive industrial promotion. It then articulates how the contemporary mega-trends are changing the feature of the automotive industry and how those changes need to be addressed in technical cooperation programmes.

10.6.1 Overview of the Automotive Industry Development Promotion in the World by JICA

As the automotive industry is an industry which can bring a lot of opportunities for local industries to become involved in its large global supply chain network and for job creation, there are potential demands from developing countries for technical cooperation. As it is Japan's flagship industry, developing countries easily recognize the value of requesting Japan to support the development of their local automotive industry and JICA can also use the rich national resources and experiences accumulated in the industry. In response to these demands, JICA has been planning and implementing technical cooperation programs for automotive industry promotion in various developing countries. Table 10.2 presents selected countries/regions which have sought on-going JICA technical cooperation for automotive industry promotion.

The main focus is to help in the capacity building of local industries which are often SMEs and may have some future potential to manufacture and supply parts and components to the giant automotive makers (otherwise known as Original Equipment Manufacturers: OEMs). Those local industries are often called 'supporting industries.' Supporting industries development has been the mainstream of JICA's technical cooperation in relation to the automotive industry.

10.6.2 Global Value Chain, Supporting Industries Development, and Linkage Formulation

The automotive industry is one of the representative industries which form a giant GVC led by multinational OEMs involving both developed and developing countries. Discussions presented in the earlier section on the GVCs are mainly on the automotive industry. These include fragmentation theory, supporting industries (parts and component industries) development, value chain analysis, and high value-added process promotion in the GVCs.

These can be found in JICA's technical cooperation with such countries as Indonesia, Philippines, Thailand, and Mexico as shown in Table 10.2. Supporting industry development has been one of the mainstream areas in industrial development

Table 10.2 Selected countries/regions with on-going JICA's technical cooperation for automotive industry promotion

No	Country/ region	Period	Notes on cooperation
1	Indonesia	Periodically from around 1995 and continuously from 2017 to 2025	A series of periodical cooperation in supporting industries development including the automotive component industry. In the Data Collection Survey on Promotion for Globally Competitive Industry (2017–19, automotive is one of three targeted industries and the on-going 'Automotive Industry Development Project' (2022–25) is in response to Indonesia's I4.0 strategy 'Making Indonesia 4.0.'
2	Philippines	Continuously from 2016 to 2024	Project for Elaboration of Industrial Promotion Plans using Value Chain Analysis (2016–19, exclusively targeted for the automotive industry), Project for Enhancement of Industrial Competitiveness through Industrial Human Resource Development and Supply & Value Chains Development (2019–24, exclusively targeted for the automotive industry)
3	Thailand	Periodically from around 1993 until 2011 and most intensively from 2006 to 2011	Experts for the Thai Automotive Institute (TAI, 1999–2001) and Automotive Human Resource Development Project (AHRDP, 2006–11). A series of periodical cooperation programmes in supporting industries development including the automotive component industry
4	Pakistan	Periodically from 2011 to 2024	A series of periodical cooperation programmes: Automotive Industry Promotion Policy Project (2011); Automotive Industry Promotion Advisors (2012–19, 22–24); Projects on automotive component manufacturing industry technology transfer (2012–13, 2015–19); Study on Automotive Industry Promotion (2020–21)
5	Bangladesh	Partially from 2017 to 2022	Automotive policy support in the Project for Promoting Investment and Enhancing Industrial Competitiveness (BIPIC, 2017–22)
6	Mexico	Continuously from 2012 to 2023	Project for automotive supply chain development (2012–15); following multiple projects on automotive component industry development
7	South Africa	From 2017 to 2027	Automotive Industry Human Resource Development Advisors (2017–20); Quality and Productivity Improvement (Kaizen) Project whose leading target sector is the automotive sector (2022–27)
8	African Region	From 2021 to 2022	'Study for the Promotion of African Automotive Industry: Post-COVID 19 Supply Chain & Mobility Reform.'

Source Author from various JICA resources including JICA [19]

cooperation, and the automotive industry and its component industries are often identified as the key target sector. The earlier Fig. 10.1 illustrates a value chain analysis implemented in Indonesia and same applied to the Philippines.

Another aspect which are growingly becoming important in relation to GVC is 'linkage formation.' This forms strong business links through FDI by OEMs with local industries to supply auto parts and components to OEM assembly factories. It includes supporting preparation of relevant automotive industry policy, incentive packages which encourages linkage formulation and provision of opportunities for linkage matching.

10.6.3 Digitalization and CASE

Digitalization in the automotive industry is strongly represented by its mega-trend called CASE—Connected, Autonomous, Shared, and Electrification. The CASE trends have become the driving force of technological innovation in the world's automotive industry and are expected to be increasingly prevalent over the next 10–15 years. Figure 10.3 is an overview of each of the CASE mega-trends [20].

Among the four items of the CASE, being 'Autonomous' is still too far away to be realized in the developing country context, especially from the industrial development cooperation aspect, thus it is not discussed in this chapter. On the other hand, both 'Connected' and 'Shared' are expected to penetrate developing countries from the digitalization and innovation aspect. 'Connected' means 'vehicles are capable of connecting to wireless networks, enabling vehicles to communicate with other vehicles and other devices' [20], while 'Shared' has been already widespread in developing countries such as ride-hailing, ride-sharing, and last mile delivery thanks

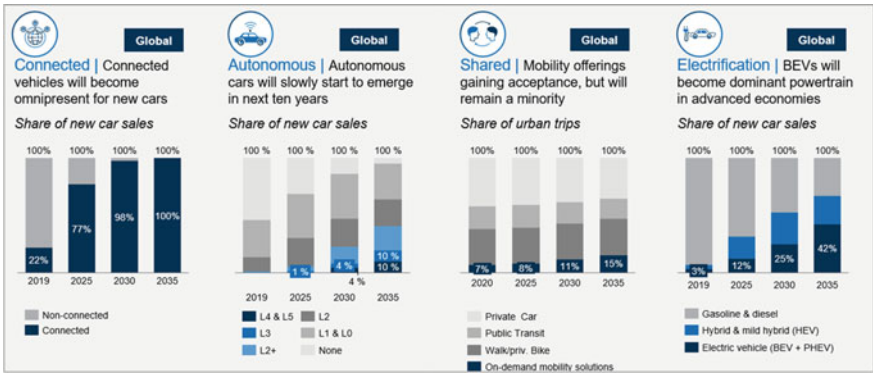

Fig. 10.3 Global Trend in CASE Penetration, 2019–2035 (*Source* BCG analysis presented in JICA and BCG [20]. *Abbreviations* Battery Electric Vehicle [BEV]; Hybrid Electric Vehicle [HEV]; Plug-in Hybrid Electric Vehicles [PHEV])

to rapid penetration of mobile phone networks. These are valuable in the context of the developing countries as they allow easy access to services and job creation.

In both Connected and Shared, startups are quite active in developing countries in providing innovative services. These are often called 'Mobility Tech' or 'Mobility Startups.' JICA is also engaged in the support of startup business mainly through its previously mentioned flagship approach, the 'NINJA Project.' Some of the mobility startups are involved and highly demonstrated such as a Cote d'Ivoire startup that focuses on inclusive Mobility as a Service (MaaS) and a Ghanaian startup which provides IC card services for smart payments.

'Electrification' is perhaps the largest trend which has a multiple influence on the four mega-trends of this chapter and is the one most related to environmental consideration, thus it will be discussed in the following subsections.

10.6.4 Carbon Neutral, Environmental and Social Consideration

Carbon neutral, as the measures to mitigate the negative impact of climate change are currently described, is one of the most important global issues and has been rapidly penetrating in the automotive industry as the top agenda. In particular, the accelerating shift from long-lasting internal combustion engine (ICE) vehicles to new energy vehicles (NEV), especially to electric vehicles (EV) is the largest revolution. Most advanced economy and major OEMs have already committed to reduce ICE and shift at a certain high level to EV by 2035. This is an unavoidable shift as a great contribution to carbon neutral society.

However, there are some concerns on this dynamic shift from ICE to EV from the developing countries' standpoint. First, EV in particular Battery EV (BEV) requires significant amount of investment in battery charging infrastructure, which is normally not affordable for the developing countries. Secondly, the number of automotive components, around 30,000 items in the case of ICE, is dramatically reduced to 1/3–1/4 of its previous level. This means that the automotive component industries, which are often SMEs in developing countries, may be damaged and their employment contribution hampered. Thirdly, the shift needs to be closely linked with their national energy mix when the life cycle (sometimes described as 'well to wheel') and value chain of the automotive industry are considered. For example, even though EV is strongly introduced in a society, it is not contributing to activities being carbon neutral if the main source of the electricity they need is a high carbon one such as coal fired power stations. Fourthly, human resources are scarce in response to electrification, especially in the after sales industry, which is quite important in developing countries.

In this context, policy support and associated studies to evaluate the potential impact of electrification is often required and are a growing demand on technical cooperation. Gradually, this may influence all aspects of automotive industry promotion support. Meanwhile, as the automotive value chain is quite influential and

involves a significant number of productive jobs in developing countries, social consequence and inclusiveness need to be considered carefully. According to the IDE-JETRO and ILO [15] report on the automotive industry's responsible supply chain, automotive and its component industry in Thailand contribute 12% of GDP and provide 700,000 jobs, which is equivalent to 2% of total employment in Thailand. The report illustrates the growing necessity for the industry to be engaged in more corporate social responsibility (CSR) especially from the aspects of human rights and decent work.

10.6.5 New Automotive Industry Promotion Landscape and Key Takeaways from the Experience of the Automotive Industry

As has been discussed in previous subsections, the automotive industry is the typical industry that is much influenced by the four mega-trends including GVC, digitalization, resilience, and social and environmental consequences. The automotive industry is also an industry whose development cooperation has evolved along with these contemporary mega-trends. Figure 10.4 illustrates the dynamic evolution of the automotive industry and its development cooperation from around 1990s and towards the Industry 4.0 era in the 2020s and onwards.

Development cooperation in the automotive industry has evolved in the following directions. First, policy support for the automotive industry becomes increasingly the more featured type of cooperation. Second, the focus on a master plan (M/P) type

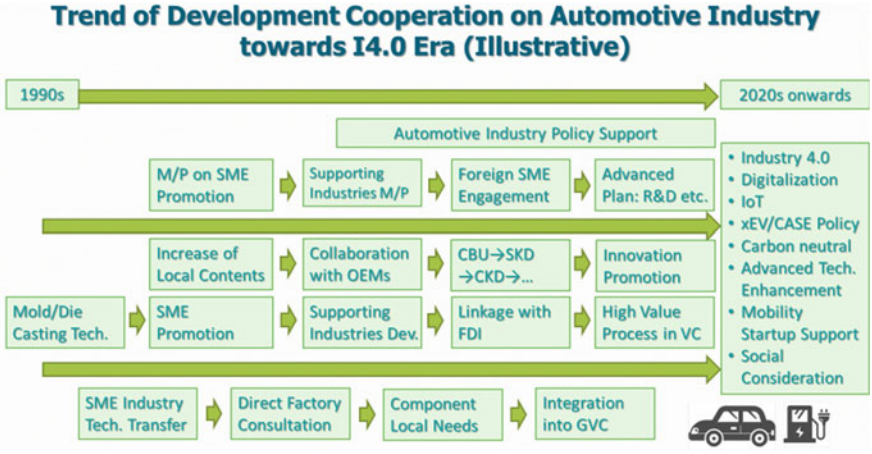

Fig. 10.4 Trends in Development Cooperation in the Automotive Industry Towards the I4.0 Era (Illustrative) (*Source* Elaborated by the author)

of cooperation has been shifting from SME promotion M/P, to supporting industries M/P, strategy on foreign SME engagement in developing countries, and further advanced planning such as R&D. Third, in relation to supporting industry development, the increase of local contents (local supply ratio of parts and components) has been always an issue and to achieve this, further collaboration with OEMs has been suggested. This features the gradual development of the mode of assembly from Complete Build-Up (CBU) to Semi Knock-Down (SKD), Complete Knock-Down (CKD), and supporting industries development. Fourth, the target area of technical cooperation has been shifting from hard to soft technologies. Previously it targeted the elemental technology for parts and components such as mold/die, casting (foundry) technology, machining, and plastic processing. It then went more towards cross-cutting or soft areas such as SME promotion, supporting industries development, linkage formulation with FDI, promotion of higher value-added process such as R&D, and innovation promotion. Fifth, the mode of technology transfer has also been shifting from the capacity building of public technology development institutes to more focus on direct factory consultation by visits, more highlights on specific component development based on local needs, and further focus on GVC participation. Finally, all these trends are currently updating towards the Industry 4.0 era. The on-going or near-future area of cooperation may include Industry 4.0, digitalization and IoT implementation, EV/CASE policy and strategy including carbon neutral measures, mobility startup support, and social considerations. This implies that value addition by 'servicification' is also valid in the automotive industry and its cooperation.

As previously mentioned, there are strong ties between the Japanese automotive industry and local industries as supporting industries to supply parts and components, such as Thailand and Mexico. Therefore, strengthening firm-to-firm relationships (discussed in Sect. 10.2.3) and formulating linkages between FDI and local industries based on mutual learning and translative adaptation have been playing a significant role in automotive industrial development.

10.7 Implications and Conclusions

This section summarizes the opportunities and challenges presented by the above-mentioned contemporary mega-trends for industrial development of developing countries and analyzes how these should or should not change the content of industrial policy and the process of policymaking and implementation. It further comments on the approach of Japanese industrial policy support to developing countries discussed in the other chapters of this volume (see Chap. 5). Then finally, it draws lessons and implications for industrial policy and Japan's industrial development cooperation in the face of the contemporary mega-trends.

10.7.1 Opportunities and Challenges Under the Contemporary Mega-Trends in Developing Countries

The above-mentioned contemporary mega-trends present both 'opportunities' and 'challenges' for developing countries. Regarding 'opportunities,' globalization and digitalization widen the chances for any developing country, which are not found in East/Southeast Asia as the 'global factory,' to take part in global production networks without a 'full-set' industrial base. Fragmentation because of GVC deepening has been providing smaller but adoptable processes utilizing host countries' advantages, and it can be observed for example that Cambodia and Lao PDR have benefited from such fragmentation. Digitalization encourages startups in Southeast Asia and Sub-Saharan Africa to create 'leapfrog' technologies and new businesses which have been changing traditional industries locally, regionally, and sometimes internationally.

As another set of opportunities, while mega-global external shocks such as COVID-19 and increased environmental and social responsibilities are often characterized as burdens, they can also supply a significant volume of potential needs (opportunities) and issues that can be solved by the power of industry. 'Corona-Tech' and social businesses are examples for these in developing countries.

On the other hand, developing countries also face 'challenges.' First, these benefits and emerging needs may not be automatically available to a developing country under the severe global competition existing today if no efforts are made to enhance its capacity to fully utilize them [35]. Capacity development at the firm, industry, and national levels is indispensable if countries want to take advantage of these opportunities. To strengthen such capacities learning and translative adaptation are also indispensable. In this context, in particular vis-à-vis the complex circumstances under the four contemporary mega-trends, there is the increasing importance of policy learning and societal learning. While the national and government level needs continuous policy learning for capacity development, the industry, firms, managers, workers and people level require social learning for achieving the same goals. For example, the benefits of GVC fragmentation may not be fully realized without further efforts to upgrade their capacity for adding more value; otherwise, the GVC opportunity may fall into a 'race to the bottom,' particularly in developing countries.

Secondly, further complexity may be generated from survival under these mega-trends in a comprehensive manner. For example, as environmental and social compliance and digitalization for IoT are increasingly needed for participating in GVCs, those businesses that want to be a part of GVCs in developing countries will need to take further consideration of these aspects in addition to upgrading their added value.

Third, particularly for industrial policies, there may be less space for policy makers to intervene in globally operated industry, considering the increasing power of MNEs and the global giant platformers to govern global (and regional/local) industries. Developing countries must therefore make further advanced and strategic industrial policies to cope with these situations [3].

10.7.2 What Does Not Change in Industrial Development Policy Under These Trends?

Despite these major trends, there are no significant changes in the fundamental policy directions raised in this volume, even though there is some acceleration for those directions. These include the following distinct features discussed throughout the volume.

First, the fundamental importance of industry, in particular manufacturing, which fully utilizes a country's advantage and leads its economic growth, remains the same. As Hauge and Chang [8] suggest, manufacturing is still the driver of productivity growth and technological development. They also argue that the existence of the service industries is largely dependent on a manufacturing core, rather than the other way around. Therefore, development policy to support such industry remains significant. Even though digitalization is rapidly advancing as we enter an information and digitalization-based society, somebody will manufacture physical products somewhere in the world.

Second, the combination of horizontal (broad-based and not trying to benefit any particular industry sectors) and vertical industrial policies (focusing on specific sectors) based on market mechanism is still crucial, and they are complementary [13]. While the comprehensive features of up-to-date mega-trends such as COVID-19, 4IR, and the SDGs need a horizontal approach, specialization at depth is also needed for each sector. This suggests the significance of a vertical approach as well. The automotive industry case in this chapter shows how a vertical approach is taken in its policy contribution and practical implementation.

Third, key areas, domains, and measures of industrial policy basically remain the same. For example, the key areas and domains proposed in Chap. 2 by Hosono, which are classified using three essential supply-side measures (education/training, firm capabilities, and technology/innovation), two other supply-side measures (finance and infrastructure), and three demand/supply measures (internal market, international trade, and foreign investment), still make sense and are equally useful when developing countries consider appropriate industry policy packages under contemporary mega-trends. Even though issues have become more complex and comprehensive under the latest trends, these domains still form an integral part of the industrial policy framework.

Fourth, the basic structure of an industrial policy document and the procedure of industrial policy formulation also generally remain the same. These still need to have vision, missions, strategy, policy instruments, and action plans with common key areas, for example in the policy documents presented in the earlier section on Industry 4.0. Although the mega-trends provide strong reasons for their consideration in the documents, procedures still need to follow the general sequence of analysis, draft making, stakeholder participation, public hearing, and finally a political decision.

Fifth, participation of government policymaking organizations and the private sector in the process is still critical. There is a need to set up a proper policymaking structure in government, with high-level initiatives and workable secretariats and

with inter-ministerial coordination mechanisms, to cover the complex issues arising from COVID-19 and environmental/social responses. Private sector participation and public–private partnership are equally significant to expose business to such complex issues.

Sixth, the combination of policymaking and implementation is still quite crucial. As it is often seen in many countries, this does not work without proper implementation even if excellent industrial policy is formulated. In other words, implementable industrial policy is required to make things happen and the results of implementation need to feed-back into policymaking, especially in the era of rapid transformative changes under digitalization and other mega-trends.

Seventh, policy learning process and policy dialogues to assist this process remain useful and effective. Even though historically accumulated replicable experiences for such up-to-date trends such as Industry 4.0 and COVID-19 are much less important, it is still important to learn about each other's on-going experiences, with hands-on policy dialogue for facilitation. This tendency implies the effectiveness of 'translative adaptation' processes, which feature hands-on approaches and learning and adaptation processes.

Eighth, FDI-led industrialization associated with linkage formulation with local industry remains highlighted. Although there are some accelerating factors such as GVCs and some discouraging factors such as the attempts to domesticate manufacturing processes seen at the initial stage of the COVID-19 pandemic, the basic direction of industrial policy toward FDI-linked industrialization remains a common approach.

10.7.3 What Changes in Industrial Development Policy Are There Under These Trends?

On the other hand, there are some significant changes in industrial policy along with these major trends. These include following the distinct features discussed throughout the entire volume.

First, concrete policy details including policy menus and priority settings may change or be expanded. For example, emerging industrial sectors such as the ICT industry should be prioritized along with digitization trends, and the idea of resilience should be added to industrial policy as one of the key directions. We obviously need to deal with more sophisticated global production networks and digitalized industries including industrial human resource development. At the same time, it is necessary to look closely at the difference of level of sophistication between, for example, upper middle-income countries and least developed countries in Sub-Saharan Africa. The automotive sector case study shows the expansion of the policy scope including not only traditional manufacturing process improvement but also new areas such as mobility concept development.

Second, the idea of sustainable and inclusive development may be enhanced. Along with the emerging function of industry (from MNEs up to startups) to provide 'solutions' for society, industrialization focus may be shifting from supply-driven (product out) to demand-driven (market in) and thereby up to 'solution-driven.' This solution-driven function seems to be accelerating in response to a wide variety and complex development issues under the with/post COVID-19 era and beyond. Digitalization further makes it easier to provide useful solutions. Resilience is again a key word in relation to sustainability and inclusiveness. Industrial development in the fragile context is also an up-to-date topic.

Third, speediness for policymaking and implementation may change. In the Fourth Industrial Revolution era and 'with/post COVID-19' situation, policy needs to be prepared and implemented at faster speed to meet immediate solution needs and fully use digital transformation benefits.

Fourth, a whole of government approach may become more crucial. Industrial policy requires not only the ministry in charge of industry. It also needs to involve more government resources beyond the typical ministry to meet with the complexity and opportunities under these trends.

Fifth, the likelihood for latecomer countries to catch up may change. In the digitalization era, many new businesses and application of new technology as solutions are emerging in developing countries, suggesting the possibility of 'leapfrog' (which suggests something beyond catchup) and even 'reverse innovation.' As it is not easy to harness such leapfrogging up to the creation of country-level significant change, industrial policy may be needed to fairly utilize such opportunities. At the same time, this means that there are also negative opportunities for the least developed countries. Again, success or failure depends on industrial policy making and implementation.

10.7.4 Conclusions

This chapter reviewed the four mega-trends influential to industrial development, and prioritized three of them, namely, GVCs, Industry 4.0, and COVID-19. It also conducted a concrete case study on the automotive industry, which is a giant and transformative industry strongly affected by such contemporary mega-trends. In concluding the chapter, following five points are raised as lessons and implications for industrial policy and Japan's industrial development cooperation.

First, although these up-to-date trends and phenomena bring significant impacts to industries in developing countries, the basic nature and framework for industrial policy may not change drastically. This includes: (i) the fundamental importance of industry/manufacturing; (ii) horizontal and vertical policy combination; (iii) key areas, domains, and measures; (iv) the structure of policy documents and the procedures in their formulation; (v) government organization and private sector participation; (vi) combination of policymaking and implementation; (vii) policy learning processes; and (viii) FDI-led industrialization.

Second, there are some significant changes in industrial policy in response to these major trends. These include: (i) concrete policy menus and priority settings; (ii) enhanced idea of sustainability, inclusiveness, and resilience; (iii) speediness; (iv) whole of government approach; and (v) latecomers' catchup chances.

Third, inter-linkages among these major trends need to be recognized to properly formulate and implement industrial policy. Examples include: (i) the usefulness of Industry 4.0 for efficient GVCs; (ii) the disruptive impact of COVID-19 on GVCs and the need for resilience; and (iii) the acceleration of Industry 4.0 to pursue a contactless digitalization world by COVID-19 through such technologies as Corona-Tech. This means increasing complexity of industrial policy.

Fourth, Japan's industrial policy support approach needs upgrading, recognizing that there are limitations to Japan's advantages based on its own industrial development, in the context of twenty-first century major trends. Developing countries may be more advanced in some cases, represented by the impact of the phenomena of leapfrogging and reverse innovation on digitalization and in response to the pandemic. What is crucial here is to consider new approaches to learning together (co-learning), solving issues together (co-solving), facilitating these joint efforts (facilitation), and accumulating in an appropriate way such experience for further utilization (experience accumulation). This may create new values of industrial policy support. At the same time, it may also correspond to the basic idea of 'translative adaptation' which features 'learning and adaptation processes.' In sum, Japan's industrial policy support approach can be further enhanced by these new approaches to co-learning, co-solving, facilitation, and experience accumulation.

Fifth, contemporary mega-trends encourage developing countries to enhance quality and productivity improvement capability to participate in GVCs and utilize digital technology. *Kaizen*, as the Japanese unique and traditional approach for industrial development through quality and productivity improvement and a still useful approach in the up-to-date context, may work on this and also create 'renewed values' under the twenty-first century's major trends of: (i) the renewal of the concept of *Kaizen* as the approach to produce 'incremental innovation;'[5] (ii) affinity with Industry 4.0 and digitalization; (iii) contributions to the responses to the pandemic, for example the concept of sanitization and efficiency; and (iv) contributions to social considerations through its human-centered bottom-up approach.[6]

Finally, this chapter offers only preliminary thoughts on the circumstances around industrial policy resulting from the major up-to-date trends. This should change

[5] Cirera and Maloney [4] suggest that *Kaizen* can contribute to increasing firm capability, in particular managerial capability, which is the initial step in future innovation. Takeuchi [34] also argues that *Kaizen* can contribute to promoting innovation in two ways: (i) the incremental innovation process during the period of business development; and (ii) the first-step innovation stage which requires the ability to discover worthy problems. These capabilities can be cultivated by implementing the philosophy of *Kaizen*.

[6] For example, Sugimoto [33] states 'A better way of labor-saving is to pick out excellent workers from the production floor and to assign them to more creative jobs, such as leaders of *Kaizen* on the production floor and leaders of the launch of a new product' (100) and suggests *Kaizen*'s philosophy of human-centered approach contributes to decent work.

rapidly overtime considering potentially influential emerging technology such as generative AI, and additional studies are necessary to deal with on-going issues. There may be also different outlooks in other sectors than the automotive industry discussed in this chapter. Hence, this research needs further elaboration with more concrete examples of the variety of countries, industries, and technologies involved in responding to such mega-trends.

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