CHAPTER

10

Contemporary Agenda on Industrial Development and Policy Support to Developing Countries

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1. Introduction: Background and Mega-trends in Industrial Development in the 21st Century

Industry has been evolving since the era of the First Industrial Revolution in the 18th and 19th centuries when steam-driven production methods were introduced and disseminated (Schwab 2016). The landscape of industrial development has again changed significantly in the first twenty years of the 21st century, with the emergence of distinct mega-trends such as globalization, digitalization, a series of unexpected giant 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 technology, 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 (2020) 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 industrial policy for the 21st century.

In seeking to answer this question, this chapter first attempts to capture the mega-trends of industrial development that have become evident in the first twenty years of the 21st century and to discuss related industrial policies and donor intervention. Then it examines the challenges and opportunities for developing countries in the face of such contemporary mega-trends and how industrial policy should/would change associated

with such trends. 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, its analysis is not necessarily limited to that sector, depending on the nature of each topic. As the manufacturing sector itself is evolving as a result of on-going changes, this chapter takes a broader perspective which can be described as 'manufacturing and beyond.'

To provide the background for the chapter, the remaining part 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.

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 into international production networks with huge global markets. The promotion and facilitation of foreign direct investment (FDI) and international trade are required to enhance GVCs. In order 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 been further activated and expanded to achieve export-oriented and FDI-led industrialization. Meanwhile, globalization incorporating GVCs, FDI, and FTAs may also create risks for developing countries in being left behind through this global competition.

The second mega-trend is digitalization. The rapid evolution of electronic technology and the consequent emergence of information and communication technologies (ICT) have dramatically changed the shape of industries in the world, in both developed countries and developing countries at the same time. A number of innovations, 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 transformations up to the level of a revolution. This is the Fourth Industrial Revolution (4IR), and it is based on virtually networked 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 has 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 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. 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 occasionally and irregularly during the past 100 or so years. The latest large one could be COVID-19, which was declared a pandemic in March 2020 and the world is still fighting against this extra-ordinary large-scale disruption as of August 2021. Even though their impacts were less than those of COVID-19, several other epidemics have affected human lives and industries in the last two decades. 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 so on. Other unexpected external shocks that need to be considered are economic shocks. The largest one 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 the demand and supply sides. But at the same time, they also create unique opportunities for new industries and innovative businesses. From the policy aspect, policies to ease pains and assist their survival are immediately needed and must be

provided; but later more positive policies to nurture such new industries and innovative businesses should also be considered. Finally, policies to strengthen the resilience of industries may be introduced for the future unexpected external shocks.

The fourth mega-trend is the growing environmental and social concerns about industrial development. Sustainable and inclusive development is 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 role of industry in contributing to the SDGs and providing solutions for environmental and social issues is increasingly attracting attention as Aiginger and Rodrik (2020) 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' (p. 191). 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 multinational enterprises (MNEs) and GVCs. Venture capital has been growing to supply seed money and beyond for startups, which contribute to providing 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 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 in the next few decades.

These four mega-trends are summarized in Table 10.1.

The remaining sections of this chapter focus on globalization, digitalization, and unexpected external shocks among the four mega-trends mentioned above. In particular, three topics from each, that is, GVCs, Industry 4.0, and COVID-19, are taken as significant keywords presented in the following three sections (Section 2, 3, and 4), as summarized in Table 10.1. These mega-trends do not necessarily exist alone, rather they are

Table 10.1. Major Contemporary Mega-trends around Industry Discussed in This Chapter

	Globalization	Digitalization	Global external shock	Environmental and social response
Keywords	GVCs, FDI, FTA/EPA	DX, 4IR, I4.0, IoT, AI	COVID-19, Pandemic, disaster, economic crisis	SDGs, ESG, Decarbonized society, Green industry

Source: Author.

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.

2. Renewed Interest in Emerging Global Value Chains (GVCs)

2.1. Overview of GVCs

The Organisation for Economic Co-operation and Development (OECD) (2021) describes GVCs as being 'where the different stages of the production process are located across different countries.' Inomata (2019, 36) defines GVCs as the production and consumption network in the global game to create and distribute values. The theoretical framework of GVCs has been conceptualized based on accumulated works such as Gereffi et al. (2005) which 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 developing country contexts. The World Bank (2019) suggests that GVCs powered the surge of international trade after 1990 and they now account for almost 50 per cent of global trade. The Bank suggests that GVCs have helped poor countries grow faster over the past 30 years and a 1 per cent increase in GVC participation is estimated to boost per capita income levels by more than 1 per cent, 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 MNEs throughout the whole process, and the network infrastructure such as transportation and communication channels,

become 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 (Hallward-Driemeier and Nayyar 2017) is important so they can avoid the 'race to the bottom' in the lower value-added production processes and can secure more benefits from higher added value processes in the upstream and downstream of GVCs.

2.2. Industrial policies in developing countries in relation to GVCs

The World Bank (2019) 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 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 "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' (World Bank 2019, 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

multi-national enterprises 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 also suggests that there is much room to have divestment if a host country which 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 and maintaining competitive labor costs for investors.

Thus, while GVCs provide wide opportunities for developing countries to earn the benefits mentioned above, they may also be 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 multinational enterprises, they should also put further effort into their industrial policies to grow local industries to be potentially linked with the GVCs. Regarding FDI-based GVCs, basically a country is not in a position to choose those GVCs, it is rather that FDI or GVC lead firms are in a position to choose countries.

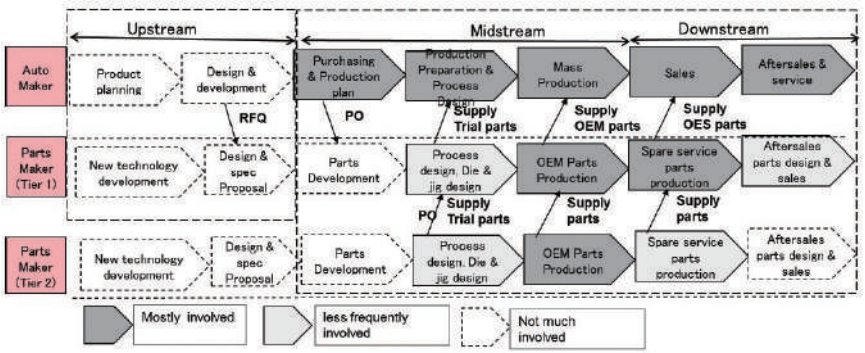
2.3. Donors' intervention in GVC-related industrial policy

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 automotive industry under Japanese 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 (2020) 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 idea of the importance of firm-to-firm relationships, as mentioned in the World

Bank report (World Bank 2019), and is a distinct feature of Japanese GVCs. As suggested in the previous sub-section, investment reform is an integral part of industrial policy related to GVCs. JICA has been supporting investment reforms in many countries 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, private/public partnership frameworks, and so on.

For more deeply related intervention in GVCs, JICA implements some technical cooperation projects 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 the course of the study, GVC analysis is conducted as shown in the example presented in Figure 10.1. This shows local parts makers are involved in the production process together with auto makers; but in other processes upstream and downstream they are less involved and value is not added locally. Furthermore, the JICA study team assisted the secretariat for inter-ministerial coordination on industrial policy to provide hands-on policy inputs including neighboring countries' good practices in response to actual needs. This hands-on support, which corresponds to 'translative adaptation processes' (see Ohno, Chapter 1), 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.

Subsequent to these recent attempts to support GVCs, the nature of JICA's intervention has been changing. First, JICA's intervention is widening from the main focus on production process in global supply chains to include those out-of-production processes that add more value, such as R&D, design processes, 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.



Source: JICA and NRI (2019).

Figure 10.1. Status of GVCs in the Automotive Sector in Indonesia

As pointed out earlier, the World Bank took GVCs as the main topic in its annual flagship report *World Development Report* 2020 (World Bank 2019), 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 (2021) also shows that the activation and appropriation of market mechanism, 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.

3. Industry 4.0 / 4th Industrial Revolution

3.1. Overview of 4th Industrial Revolution / Industry 4.0

The 4th Industrial Revolution (4IR) is recognized as introducing 'smart applications that integrate virtual and physical production systems,' following the 1st Industrial Revolution (1760-1900, the use of steam and mechanically driven production facilities), the 2nd Industrial Revolution (1900-70, mass production driven by electricity and based on division of labor), and the 3rd Industrial Revolution (1970-present, extensive use of controls, information technology, and electronics for an automated and high-productivity environment) (ADB 2018, based on Schwab 2016).

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 Internet of Things (IoT) and Cyber Physical System (CPS) as its core, Industry 4.0 harnesses the three concepts of connecting, replacing, and creating to achieve more efficient production and productivity improvement (Nagashima 2015). The concept of Industry 4.0 is sometimes interchangeably used with the term 4IR. The United States (US) followed the German movement, and the Industrial Internet Consortium was created.

A World Bank publication by Hallward-Driemeier and Nayyar (2017) shows that the top 10 technologies associated with Industry 4.0 are: the IoT, big data analytics, 3D printing, robotics, smart sensors, augmented reality (AR), cloud computing, energy storage, AI / machine learning, and nano-technology. 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 (2019) 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 become more easily available even in least developed countries such as those in Sub-Saharan Africa. On the other hand, close to 50 per cent of tasks could be automated by 2030, affecting 760 million workers in emerging economies (Mischke 2019). The digital divide, which means 4 billion people in the world being outside the digital economy, may be becoming more serious especially in developing countries. It is important to analyze the pros and cons of the impacts of 4IR on the future of developing countries.

3.2. Industrial policies in developing countries in relation to Industry 4.0

In response to rapidly growing interest in 4IR in western countries, several countries in Asia have been attempting to accommodate this movement into national policy. In 2015, China set forth 'Made in China 2025,' which contains innovation of manufacturing as a target utilizing 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, which 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' on manufacturing products from numerous parts with optimal adjustment thanks to its technological capability. However, 'modular architecture,' which represents simple assembly of units with less coordination than the 'integral architecture,' becomes more mainstream under the global digitalization era (Lim and Fujimoto 2019). 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 essentially 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 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 (Memedovic 2019).

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 (JICA and NRI 2019). Industrial human resource development is required 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 initiate digital technology-driven businesses utilizing 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 establishing a fiscal/non-fiscal incentive framework for enhancing such opportunities.

3.3. Japan's possible intervention in Industry 4.0

Industry 4.0 is still new even to Japan, particularly in its technical cooperation area. Under such a situation, what can Japan or JICA contribute to adding value in this area? JICA commenced the 'Data Collection Survey on Upgrading Manufacturing Industry using the Latest Technology' in 2019 with some field surveys in the target countries such as Thailand, Vietnam, Indonesia, Malaysia, and Myanmar, as well as literature surveys on the 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.

The Survey so far has found that the industries in the target countries are generally not fully equipped to accommodate Industry 4.0 developments such as IoT in their industry. Nevertheless, it has identified some trial cases and potential needs. The Survey has also found that Industry 4.0 has an affinity with *Kaizen*,[1] which: (i) has the distinct feature of data

[1] *Kaizen* is an inclusive and participatory approach to the continuous improvement of

visualization; (ii) originates from statistical quality control; and (iii) is fairly well disseminated in the surveyed Southeast Asian countries (Homma 2020a). Furthermore, Japan may have comparative advantages over other countries in certain areas of manufacturing industries, in particular robotics and factory automation where hardware technology and software technology are integrated. These areas could be prioritized and promoted.

As was implied previously, Industry 4.0 is still new even in Japan, especially 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 how to make this future concept a reality. Therefore, it seems that a co-learning and co-creation approach is needed and suitable rather than the traditional type of one-way technology transfer. It should be appropriate for Japan to think together and learn together about how to accommodate Industry 4.0 in host developing countries, utilizing a hands-on approach with a problem-solving methodology such as *Kaizen*.

4. COVID-19 and Industrial Development

4.1. Overview of the COVID-19 pandemic

The World Bank (2021a and 2021b) suggests that the world real GDP growth in 2020 was -3.5 per cent 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 in 2020 decreased by 8.3 per cent compared with the previous year. The International Labour Organization (ILO) (2021) confirms the massive impact that labor markets suffered in 2020 with 8.8 per cent 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

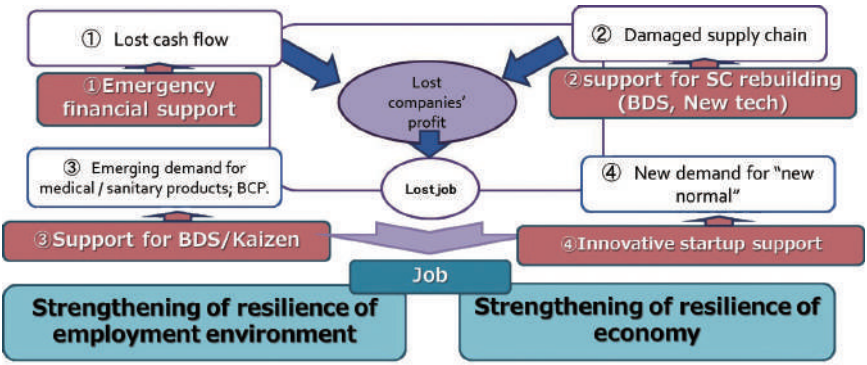
quality and productivity, resting on a distinctive philosophy and tools/methods. It forms the basis of multiple management systems, including TQM and TPS, developed in Japan and adapted for use in other countries (Hosono et al. 2020).

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 (2020) reveals that enterprises in the surveyed developing countries claim they stopped operations due to COVID-19 (70 per cent of respondents), experienced a shortage of cash flow (86 per cent), and received less than half the number of orders compared with before-COVID-19 (33 per cent). Furthermore, GVCs are 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 are being enhanced.

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 (2019) suggests three-stage policy support: (i) relief; (ii) restructuring; and (iii) resilient recovery. Initially, immediate actions are required to mitigate shocks and short-term financial schemes should be provided for mainly SMEs and for job security. The ILO (2020) reveals that enterprises in the surveyed developing countries need support in the form of business continuity advice (50 per cent of respondents), advice on export and logistics restrictions and requirements (38 per cent), 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 a resilient recovery stage, there is a need to secure a firm foundation and 'build back better.'



Source: JICA Private Sector Development Group (2020), cited in Homma (2020b).

Figure 10.2. JICA's Support in Private Sector Development in Response to COVID-19

JICA has formulated a framework for supporting its private sector development (PSD) program in response to COVID-19 (Figure 10.2). This identifies 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 the JICA NINJA[2] Business Plan Competition in response to COVID-19, based on its startup support 'Project NINJA.' This is essentially 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 tool, online sales, logistics/delivery system, and other Corona-Tech-based business. It supports proof of concept (POC) for the winners for their business ideas, and attracted 2,713 applicants by August 2020 from 19 African countries.

Each donor agency has created a COVID-19 specialized website. DCED created one of the fastest knowledge portals on its website called 'Private

[2] NINJA stands for 'Next Innovation with Japan' (JICA's startup support activities).

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 (d) building agency knowledge portals, statements, and funding activities.

4.3. Resilience and future pandemic and other challenges

As discussed in this section, there are tremendous negative impacts caused by COVID-19 on industry; at the same time, there are also some new positive opportunities for the future such as Corona-Tech.

This section also repeats the use of the word 'resilience' as one of the key words in dealing with these impacts. COVID-19 is indeed one of the heaviest shocks in a century but similar pandemic and other unexpected external shocks including natural disasters may attack industry again in the future. What is required for preparing for such future anticipated events is to enhance the resilience of industries. 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 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 resilience of industries in the long run.

5. What Does and Does Not Change in Industrial Development under These Trends?

This section builds on the prior analysis of the contemporary mega-trends, in particular GVCs, Industry 4.0, and COVID-19, and summarizes their distinct opportunities and challenges in the context of the industrial development of developing countries. It then analyzes how these should or should not change the content of industrial policy and the process of policymaking and implementation, as well as the firming up of Japanese

industrial policy support to developing countries as discussed in the other chapters of this volume. Sub-section 5.1 articulates the opportunities and challenges caused by the above-mentioned contemporary mega-trends for industrial development of developing countries. Then Sub-section 5.2 discusses the immovable nature of industrial development policy. Finally, Sub-section 5.3 deals with anything that changes significantly in industrial development policy vis-a-vis these mega-trends.

5.1. 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 countries, which are not located in the East/Southeast Asia as the 'global factory,' to participate in global production networks without a 'full-set' industrial base. Fragmentation as a result 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 angle 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 provide 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 (Todo 2008). Capacity development at the firm, industry, and national levels is indispensable if countries want to take advantage of these opportunities. 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".

Secondly, further complexity may be generated from surviving under these mega-trends in a comprehensive manner. For example, as environmental and social compliance and digitalization for IoT are increasingly required for participating in GVCs, those businesses that want to be a part of GVCs in developing countries 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 are therefore required to make further advanced and strategic industrial policies to cope with these situations (Cimoli et al. 2009).

5.2. 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 following the 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. Therefore, industrial development policy to support such industry remains significant. Even though digitalization is rapidly advancing as we enter an information and digitalization-based society, physical products will be manufactured by somebody somewhere in the world.

Second, the combination of horizontal (broad-based and not attempting to benefit any particular industry sectors) and vertical industrial policies (focusing on specific sectors) is still crucial, and they are complementary (see Hosono, Chapter 2). While the comprehensive features of up-to-date mega-trends such as COVID-19, 4IR, and the SDGs require a horizontal approach, specialization at depth is also needed for each sector. This suggests the significance of a vertical approach, as well.

Third, key areas, domains, and measures of industrial policy basically remain the same. For example, the key areas and domains proposed in Chapter 2 by Hosono (2021), 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 become more complex and comprehensive under the new trends, these domains still form an integral part of industrial policy framework.

Fourth, the basic structure of an industrial policy document and the procedure of industrial policy formulation basically remain the same. They 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, government policymaking organizations and private sector participation in the process are still critical. There is a need to establish a proper policymaking structure in the 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 observed 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 for making things happen and the results of implementation need to be feed-backed to 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 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 may imply 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 observed at the initial stage of the COVID-19, the basic direction of industrial policy toward FDI-led industrialization remains a common approach.

5.3. What changes in industrial development policy under these trends?

On the other hand, there are some significant changes in industrial policy along with these major trends. These include following distinct features discussed throughout the entire volume.

First, concrete policy details including policy menu and priority settings may change or be added. For example, emerging industrial sector such as ICT industry should be more prioritized along with digitization trends, and the idea of resilience should be added to industrial policy as one of the key directions. It obviously needs to deal with more sophisticated global production network and digitalized industries including industrial human resource development. At the same time, it requires to look at closely the difference of level of sophistication between, for example, upper middle-income countries and least developed countries in Sub-Saharan Africa.

Second, the idea of sustainable and inclusive development may be enhanced. Along with the emerging function of industry (from multinational enterprises 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 accelerated 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 4th 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 utilize digital transformation benefits.

Fourth, a whole of government approach may be 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 for solution 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 least developed countries. Again, success or failure depends on industrial policy making and implementation.

6. Implications and Conclusions

Based on the discussions in the previous sections in this chapter, and additional thoughts, the final section draws lessons and implications in relation to industrial policy support and contemporary mega-trends.

First, the four mega-trends around industrial development as summarized in the above—globalization, digitalization, unexpected external shocks, and environment/social responses—are quite influential, and this chapter has prioritized three of them, namely, GVCs, Industry 4.0, and COVID-19 as typical examples.

Second, although these up-to-date trends and phenomena bring significant impacts on industries in developing countries, the basic nature

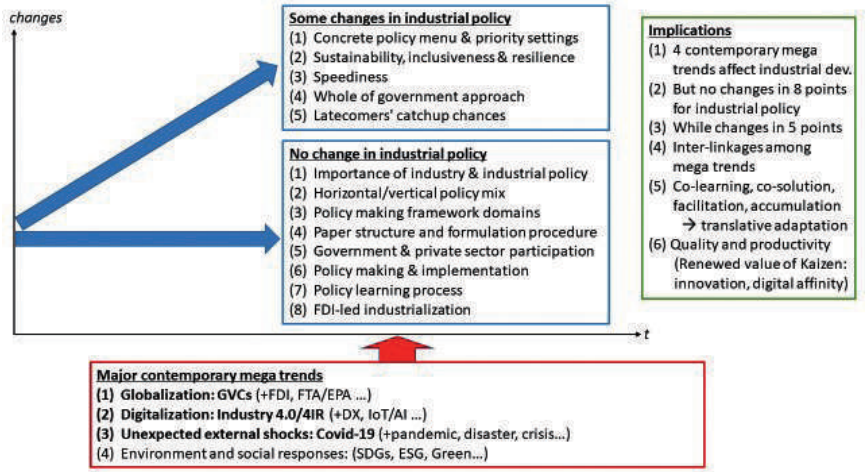
and framework for industrial policy may not change drastically. These include: (i) the fundamental importance of industry/manufacturing; (ii) horizontal and vertical policy combination; (iii) key areas, domains, and measures; (iv) the structure of policy documents and the procedures in their formulation; (v) government organization and private sector participation; (vi) combination of policymaking and implementation; (vii) policy learning processes; and (viii) FDI-led industrialization.

Third, there are some significant changes in industrial policy in response to these major trends. These include: (i) concrete policy menu and priority settings; (ii) enhanced idea of sustainability, inclusiveness, and resilience; (iii) speediness; (iv) whole of government approach; and (v) latecomers' catchup chances.

Fourth, inter-linkages among these major trends also need to be recognized to properly consider industrial policy. For example, (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.

Fifth, regarding Japan's industrial policy support approach, we should recognize that there are limitations to Japan's advantage from its own industrial development in the context of 21st 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 conclusion, Japan's industrial policy support approach can also be upgraded by these new approaches to co-learning, co-solving, facilitation, and experience accumulation.

Sixth, 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



Source: Author.

Figure 10.3. Implications of Industrial Policy Support in Response to Contemporary Mega-trends

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 21st century's major trends of: (i) the renewal of the concept of *Kaizen* as the approach to produce 'incremental innovation;'[3] (ii) affinity with Industry 4.0/digitalization due to the nature of data visualization; (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.

Figure 10.3 summarizes and conceptualizes the implications raised above on industrial policy and contemporary mega-trends. The long arrows show changes over time in industrial policy based on major contemporary mega-trends.

Finally, this chapter offers only preliminary thoughts and circumstances around industrial policy resulting from the major up-to-date trends. This should change rapidly over time, and additional studies are necessary to deal with on-going issues. Hence, this research needs further elaboration

[3] Cirera and Maloney (2017) suggested *Kaizen* can contribute to increasing firm capability, in particular, managerial capability, which is the initial step to future innovation.

with more concrete examples of the variety of countries, industries, and technologies involved in responding to such mega-trends.

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