Economic Research Institute
for ASEAN and East Asia

Policy Brief

NO. 2020-06, JULY 2020
ISSN: 2086-8154

# ASEAN Development and Innovation Strategy in the Era of New Industrialisation

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## Key Messages:

- **Foreign direct investment (FDI) and trade** will continue to be major development drivers for the Association of Southeast Asian Nations (ASEAN).
- **Firms of ASEAN Member States (AMS) need to enhance** their own innovation capability to create new business opportunites.
- **The AMS policy of human resource development and technology adoption** should be arranged in accordance with their industrial development stages.
- **AMS can use new development strategies based on 4IR** and establish an 'innovation niche' that is competitive, attractive, and unique to the rest of the world.

*Foreign direct investment (FDI) and trade will continue to play an important role in the assimilation of the latest technologies within the Association of Southeast Asian Nations (ASEAN) Member States (AMS). However, it is also necessary for ASEAN firms to enhance their own innovation capabilities to create new business opportunities. Fostering this innovation requires developing human resources by not only equipping workers with appropriate knowledge and the skills needed by the manufacturing industry, but also nurturing 'technology entrepreneurs' who can innovate using the latest information and communication technology. While AMS can accelerate technology adoption by strengthening networks, particularly with developed countries, they also need to create unique 'product innovation' of goods and services in addition to cost-reducing 'process innovation.' With respect to national innovation systems, AMS can use 'leapfrogging' (skipping development stages) and 'feedback' (introducing advanced technologies into old industries) development strategies based on the Fourth Industrial Revolution (4IR) and establish an 'innovation niche' that is competitive, attractive, and unique to the rest of the world.*
*This policy brief presents goals, analyses, and policy recommendations on human resource development, technology adoption, and innovation to achieve quality growth in the era of new industrialisation.*

## Background

Foreign direct investment (FDI) and trade have been critical to the growth of ASEAN Member States (AMS) since the 1980s. AMS have benefited from the 'second unbundling' where production blocks are no longer limited by national or geographic boundaries but become internationally fragmented (Baldwin, 2011). In addition to creating employment and production, FDI also channels the latest knowledge and technology to ASEAN firms.

To fully benefit from this FDI, however, AMS must enhance their own capacity to adopt technology and innovate. Of the highest importance is developing human resources by giving workers the knowledge and skills needed by the manufacturing industry. Therefore, the overall educational system must emphasise vocational training, with the curriculum tailored to meet business needs.

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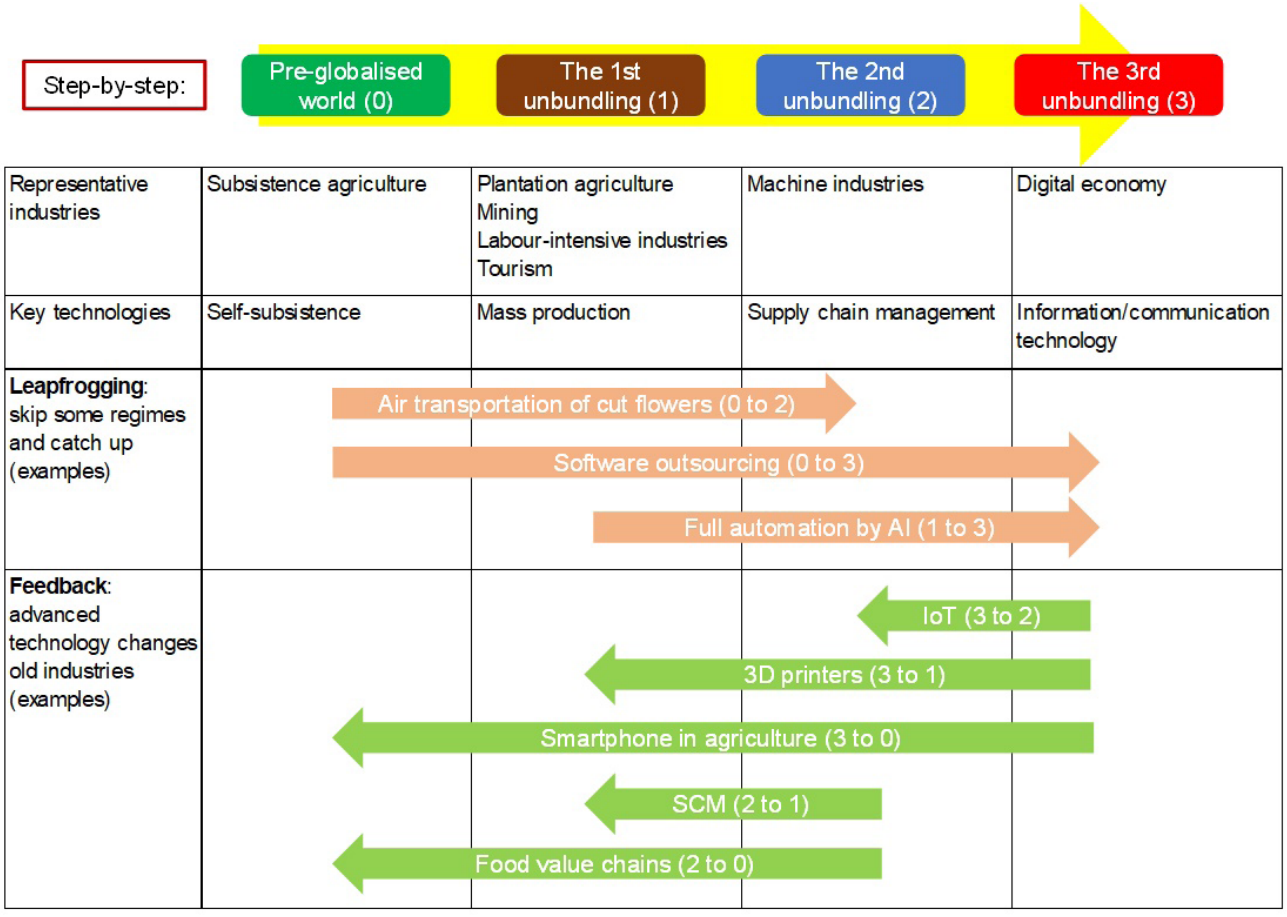
At the same time, the recent development of information and communications technology (ICT) and digitalisation has triggered changes in the development strategies of AMS. A new type of industrialisation is possible through the creation of innovation in the global economy (Baldwin, 2016). Leveraging their national innovation systems, AMS can apply 'leapfrogging' (skipping some development stages) and 'feedback' (introduce advanced technologies into old industries) development strategies and become more competitive in traditional industries (Kimura, 2018).

Figure 1 illustrates how leapfrogging and feedback work as part of the development process related to the three stages of unbundling.

These trends towards new industrialisation seem to be accelerating with the outbreak of COVID-19. AMS have an opportunity to benefit by adopting appropriate policies that enable them to showcase a new ASEAN growth model that positions ASEAN as a global centre of FDI and innovation.

What follows are goals, analyses, and policies for (1) human resource development, (2) technology adoption, and (3) innovation in AMS, taking into consideration individual national industrial development stages. This policy brief is expected to help AMS realise high-quality growth in the era of new industrialisation.

**Figure 1 : Industrial Dynamism within and between Unbundling Regimes**




AI = artificial intelligence, IoT = Internet of Things, SCM = supply chain management.
Source: Author's edition of Kimura (2018).

## (1) Human Resource Development

**Goal: All AMS have human resources that meet the needs of industry in accordance with industrial development stages**

**Analysis:** The quality of human resources is key to achieving robust industrialisation and economic growth, particularly in developing AMS. In the 'first unbundling,' where industrialisation has just started, industry demands good local workers who have completed primary and secondary education and have acquired basic learning skills. The 'second unbundling' emphasises the need for vocational education to produce good professional engineers and managers, which is still insufficient in some AMS where the quality of the average worker does not satisfy these requirements, particularly for multinational companies (MNCs). Improved vocational education for students and reskilling of business people is expected to facilitate matching of workers with firms; improve productivity at the firm, industry, and macro levels; and increase workers' wages.

The 'third unbundling' requires professional skilled digital workers with a good command of ICT. AMS need 'technology entrepreneurs' who can develop innovative ICT applications for traditional industries in their home countries and thus create unique businesses. More specifically, university graduates with science, technology, engineering, and mathematics (STEM) skills are highlighted because they are likely to create new business opportunities with possible positive spillovers for other workers or users of platform services (Gennaioli et al., 2013).

**Policy Recommendation 1:** Increase government investment in public education by setting concrete mid- to long-term goals for education expenditure. Central and local governments can use fiscal mechanisms that automatically assign specific revenue for education.

**Policy Recommendation 2:** Provide technical education such as professional technical colleges and engineering universities in cooperation with foreign partners. Moreover, AMS need to focus more resources on university education, especially in STEM, to create engineers and scientists who have the potential to become technology entrepreneurs. Given enough resources, universities can provide a foundation for technology adoption and business creation by their faculties and students.

**Policy Recommendation 3:** Promote human resource development through private firms' economic activities and on-the-job training to enhance knowledge and technology skills of professional workers. AMS should provide financial incentives, especially to local firms, to increase education and/or training.

**Policy Recommendation 4:** Encourage ASEAN students to study technology abroad by offering scholarships conditional on returning to work for home governments, universities, and firms after graduation; by promising better treatment of returning students in universities and public research institutes; and by preparing business incubators, support for start-ups, and job/business matching,

**Policy Recommendation 5:** Increase use of EdTech. With restrictions on people's movement during COVID-19, EdTech has become popular due to its huge potential to support students and workers in multiple ways including through engineering and computer programming classes and online lectures by professors from leading global universities.

## (2) Technology Adoption

**Goal: All AMS have accelerated technology adoption through strengthened networks with outside partners, and technology entrepreneurs are able to facilitate technology adoption by themselves**

**Analysis:** Liberalised trade and investment have been major driving forces in accelerating economic development. Today they can be enhanced through economic and social networks which can facilitate transfer of information, knowledge, and technology. First, technology from FDI is diffused to and adopted by local firms and workers through MNCs' technical guidance on management and skills. Second, trade requires local firms to learn foreign technology to meet product-quality requirements. Thus, an FDI-dependent and export-oriented growth model will continue to expedite the industrialisation of AMS.

Face-to-face communication and direct contact with people are still significant modes of transmitting knowledge since knowledge tends to be geographically localised. Therefore, domestic industrial agglomeration is critical for technological development and innovation via networking activities. Despite the amount of remote working we have experienced during COVID-19, ICT development is likely to complement – not replace - face-to-face communication and physical contact.

Nonetheless, technology adoption based on FDI and trade may have serious limitations in that such strategies tend to produce only cost-reducing 'process innovation.' If AMS want to proceed to the next industrial development stage (the 'second' and 'third unbundlings'), firms need to create unique 'product innovation' of goods and services, wherein existing industries can be transformed. This transition requires innovation capability to achieve technology-driven development.

Countries that accept more business travellers from developed countries significantly increase patenting (Hovhannisyan and Keller, 2015). Hence, AMS could enhance innovation capability through support of those who have outside knowledge and skills from foreign countries.

**Policy Recommendation 6:** Continue to strengthen the networks between local firms and MNCs and/or large domestic firms to promote technology adoption. Policy support includes: promoting education and job training to enable assimilation of foreign technologies; encouraging domestic firms to supply intermediate inputs to MNCs and/or large domestic firms (e.g. public technology centres); and encouraging MNCs to conduct R&D in collaboration with local firms through additional financial incentives (e.g. tax preferences).

**Policy Recommendation 7:** Promote industrial agglomeration that facilitates technology adoption by establishing innovation intermediaries and business-to-business and business-to-academia collaboration through business-matching activities.

**Policy Recommendation 8:** After COVID-19, facilitate the movement of business people, students, and travellers across borders by, for example, accelerating open-sky agreements and easing visa acquisition. Immigrants or students who have studied or worked abroad are encouraged to help improve productivity and innovation of local technology entrepreneurs by transmitting advanced technology and helping them achieve product innovation.

## Innovation

**Goal: All AMS have enhanced innovation activity and the capability to move beyond process innovation to product innovation.**

Concern is growing that some AMS may fall into a middle-income trap, where their growth in gross domestic product per capita will stagnate at the upper-middle-income level. However, many AMS still substantially lack investment in innovation activity and capability to achieve technology-driven development. AMS need to explore how they will move beyond process innovation to product innovation in order to achieve new industrialisation led by digital technologies.

This goal is divided into the following three sub-goals.

**Goal 1: All AMS have the foundation for an innovation-driven economy.**

**Analysis:** In innovation-driven economies, the knowledge stock of intangible assets must be a foundation for innovation. Intellectual property rights (IPR), implicit knowledge of firms and workers, and quality management could have long-term positive economic impacts. In addition, good quality public research institutes and universities would promote local technology start-ups and innovative firms.

**Policy Recommendation 9:** Give responsibility to a single government body to develop the national innovation system. This body should have authority, strong leadership, and a holistic viewpoint to lead and coordinate innovation policy across governmental departments (Ambashi, 2019). Then, lay a solid foundation for an innovation-driven economy by steadily implementing strategic measures to strengthen IPR protection.

**Policy Recommendation 10:** Invest in science, technology, and innovation ('STI') and development of good quality public institutions of innovation systems such as HEInnovate in the European Union. The public side of innovation systems is very important for the development of new innovative firms.

**Goal 2: All AMS provide innovation-friendly environments, primarily for the private sector.**

**Analysis:** Regulation of intermediate goods markets, subsidies, and trade, amongst others, tends to have negative effects on efficient resource allocation, particularly in innovative sectors (Restuccia and Rogerson, 2017). This implies that unnecessary regulation hinders productivity improvement and innovation. Management quality may also deteriorate in insufficient market competition caused by unnecessary regulations (Bloom and Van Reenen, 2007). Thus, healthy market competition and a level-playing field based on sound regulatory reform would support innovation-friendly environments.

**Policy Recommendation 11:** In response to COVID-19, prevent unnecessary bankruptcy and disruption of global value chains (GVCs), and, after the pandemic, promote industrial dynamism by encouraging high-productivity firms to swiftly enter and low-productivity firms to gradually exit the economy. Whilst micro-, medium-sized, and small enterprises (MSMEs) must be protected, excessive regulations that interfere with market entry and exit should be removed if they lead to resource allocation inefficiency and low productivity. This requires improving governance and regulations, including in both manufacturing and services, to strengthen GVCs.

**Policy Recommendation 12:** Provide institutional support, especially for MSMEs and start-ups, to enhance productivity and innovation including not only typical financial incentives but also collaborative research consortia; contract research delegated to the private sector; extension programmes to connect social demand with business innovation; and career programmes.

**Goal 3: AMS industries are unique and globally competitive through 4IR and 'innovation niches'**

**Analysis:** During COVID-19, ICT has been rapidly advancing and applied to various industries through trial and error. We are witnessing the third unbundling, where task-wise division of labour is globally advanced, and AMS are required to modify their development strategies. The adoption of new 4IR, enabled particularly by information technology, would give firms and individuals a better chance to rapidly increase production and find jobs when the economy starts recovering. 4IR could have a greater impact on the whole economy in saving resources and generating new products and services than current industrial robotics. Further advancement of communication technology is reducing face-to-face costs so that task-wise division of labour is possible. As a result of these technologies, leapfrogging and feedback development strategies are available, in addition to the existing phased development strategy.

**Policy Recommendation 13:** Together with the private sector, select which industries are most amenable to 4IR. Selection criteria can include comparative advantage and global demand for the goods and services offered by AMS firms, which might include agriculture, fisheries, tourism, hospitality, information technology and software, and education.

**Policy Recommendation 14:** Consider leapfrogging and feedback development strategies using ICT. The leapfrogging development strategy might include export-oriented commercial agriculture; service outsourcing; and plantations and mining controlled by artificial intellegence. Examples of a feedback strategy might include smartphone use in agriculture; 3D printing in the manufacturing industry; and the Internet of Things on manufacturing floors. It is imperative to use new ICT in a wider range of industries where AMS are competitive, attractive, and unique to build 'innovation niches' that can fill a gap in large innovations developed by globally leading ICT companies

## Conclusion

After, even amidst, the COVID-19 pandemic, AMS should continue to use the FDI strategy of partnering with developed countries to assimilate new technologies including 4IR. However, it is also time for AMS to benefit from the latest technologies in view of human resources development, technology adoption, and innovation. AMS should formulate supplementary policies on these issues, which would culminate in quality of growth in the era of new industrialisation.

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