



BACKGROUND NOTE

Catch up Innovation: A Stratified Approach to Support Technology Upgrading of Firms in Indonesia

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CATCH UP INNOVATION: A STRATIFIED APPROACH TO SUPPORT TECHNOLOGY UPGRADING OF FIRMS IN INDONESIA

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As historically observed, economic development is a process of technological catch-up with frontier economies. Many firms in developing countries face challenges when it comes to technological adoption and upgrading as well as in pursuing innovation. An immediate challenge faced by Indonesian firms is increasing the adoption of new technology. Firms acknowledge that they are unable to upgrade their technology usage and practices as quickly as their competitors in advanced economies. This was one of the findings of the joint Asian Development Bank and Ministry of Finance study, *Innovate Indonesia*, which explores the impact of new technologies across major economic sectors in Indonesia and identifies policy options that have potential to support technological transformation.²

To address the need for technology transfer, it is important to recognize that firms in Indonesia are at different stages of technology adoption and sophistication. Although 6% of surveyed manufacturing firms are already using advanced and new technologies, the majority—64% of surveyed manufacturing firms—are not yet able to take advantage of the benefits of new technologies available (see figure).

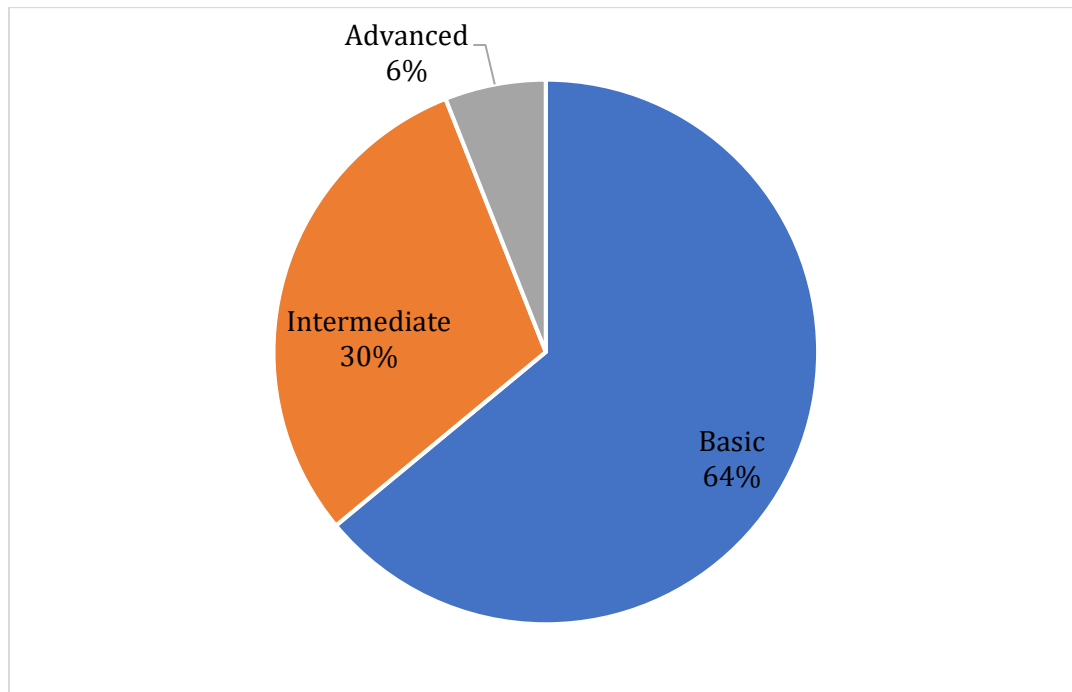
Technology adoption and upgrading is a phased process. Many Indonesian firms need to gradually build up the know-how required to transition their technology usage from basic to advanced. Many firms' capabilities need to be developed by making more effective use of existing technologies, while frontier firms often require support for producing technological innovations.

From a policy perspective, support for this incremental buildup of technology know-how demands a stratified approach. This approach combines a variety of support mechanisms to address the different challenges faced by firms at varying levels of technology adoption.

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² Asian Development Bank and Ministry of Finance. 2020. *Innovate Indonesia: Unlocking growth through technological transformation*. Manila.

Level of Technology Adoption by Manufacturing Firms



Notes: Data collected from a survey of 502 manufacturing firms.

Basic level: the organization performs many activities with existing software tools such as word processing, spreadsheets, presentations, and e-mail.

Intermediate level: some advanced technologies, such as SAP and Oracle, are used in specific management operations such as resource planning, customer relationships, computer-aided manufacturing, and supply chains collaboration.

Advanced level: the digitally enabled tools of Industry 4.0 are adopted such as robotics, cloud computing, big data, 3D printing, and artificial intelligence.

Source: Asian Development Bank and Ministry of Finance. 2020. *Innovate Indonesia: Unlocking growth through technological transformation*. Manila.

Several support mechanisms such as access to information, technical training, fiscal incentives, and credits may be required by firms across all levels of technology adoption. Examples of stratified support mechanisms for technology adoption relevant for firms at advanced, intermediate, and basic levels include:

- (i) Advanced firms may benefit more from support mechanisms aimed at building invention and technology-generation capabilities, such as the funding of cutting-edge research and development for product and service innovation.
- (ii) Firms with intermediate levels of technology adoption may need to catch up by further developing absorption and innovation capabilities. For example, through competitive grants mechanisms that encourage development of new innovative projects and promote access to advanced facilities not commonly found in-house.
- (iii) Firms using basic technology lag behind their competitors and need to improve elementary management and technology practices. For example, mechanisms to support rudimentary technology adoption, business advisory programs, and sharing best practices.

Examples of mechanisms to support firms' technology transformation can be drawn from international experience:

- (i) The Innovation and Capability Voucher scheme in Singapore provides customized grants for small enterprises on innovation consultancy services, productivity, human resources, financial management, equipment, technical solutions, professional services, and design and renovation services. The extensive range of services eligible has evolved in response to changes in demand from client firms.
- (ii) The Manufacturing Innovation 3.0 initiative in the Republic of Korea, for instance, offers individualized technical support for firms, which includes subsidized consulting advice on manufacturing processes and innovation, as well as technical advice on project performance management and management for innovation tasks.

A policy based on a stratified technology transfer approach can provide more tailored support for transformation of firms' capabilities at various of levels of sophistication in Indonesia.