Two Strategies for Innovation and Growth in Asia and the Pacific

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1. Why is Innovation Important?

Innovation is crucial for resilient and sustainable economic growth. Economic growth, which can be captured by the total output produced in an economy, is driven by capital, labor, and total factor productivity. Economic development, additional labor and capital inputs result in many marginal products and high growth rates. However, both labor and capital inputs in production functions exhibit diminishing returns to scale (Figure 1). In other words, each additional unit of labor and/or capital yields fewer marginal products; at a certain point, this may stagnate or even be negative. Therefore, economic growth by adding labor or capital inputs is not sustainable, particularly when an economy enters a phase of low growth. Moreover, an economy cannot expand labor and capital inputs boundlessly as they are finite resources. Countries experiencing an ageing population, for instance, cannot further increase their labor input. While input-driven growth is limited and unsustainable, productivity does not cease to provide growth in output with limited inputs. Many advanced countries have been focusing on productivity-driven growth; nevertheless, many developing countries are currently facing difficulties in transforming from input-driven to productivity-driven growth, i.e., the so-called middle-income trap. Productivity can be improved by knowledge, technology, and innovation.

The Republic of Korea's case has exemplified successful economic development, beginning with labor-intensive growth in the 1960s, followed by capital-intensive growth in the 1970s, and productivity-driven growth from the 1980s onward. Labor-intensive industrialization started after the Korean War in the 1950s, with the rural population as the main labor resource for light industries such as textiles. Capital accumulation through textile exports allowed investing in heavy and chemical industries in the 1970s. Once steel, automobiles, and petrochemicals became the main industries, the Republic of Korea shifted from labor-intensive to capital-intensive growth. According to Hahn and Shin (2010), gross domestic product (GDP) growth per person was at 4.6% in the 1970s, with capital contribution constituting 3.8%. Moreover, the transformation to productivity-driven growth, as driven by information and communication technology, started in the 1980s and led to a 6.1% GDP growth per person in the 1980s, with a 3.4% contribution of total factor productivity (TFP), a substantial increase from the 1970s rate of 0.8%.

1 According to classical economic theory, output in the production function $Y = A \times f(K,L)$ is determined by capital input ($K$), labor input ($L$), and total factor productivity ($A$) (Solow 1956).
Innovation can be created within ecosystems through the dynamic interactions of entrepreneurs, researchers, and policy makers. According to the World Intellectual Property Organization (WIPO 2022), an innovation ecosystem is a combination of all stakeholders that influence innovation-related outcomes. Major stakeholders include entrepreneurs; researchers, including universities, public research organizations, and policy makers such as government agencies; financial institutions; and intellectual property offices. All stakeholders should interact with each other geographically and thematically to form a dynamic ecosystem (Figure 2). The interaction in a city, a region, or a specific global value chain creates more opportunities for innovation, as with, for instance, Silicon Valley in the US.

The government plays a critical role in supporting the whole stage of innovation, not only by making policies on education, research and development (R&D), patents, etc., but also by providing incentives such as subsidies, tax exemptions, and regulations. According to WIPO (2022), policy makers have a set of instruments in each stage of innovation, including policies on discovery, risk mitigation and early adoption, and diffusion (Figure 3). With discovery policies, governments usually provide funds for academic and research organizations. Risk-mitigation and early-adoption policies are most effective in the early stages after the initial discovery. R&D subsidies, soft loans, and R&D tax incentives are three typical policy instruments at this stage. Moreover, diffusion policies are suitable for innovation widening and deepening stages. Governments can step in and provide workforce training, subsidies, loans, tax credits and direct purchases to diffuse successful technology. Apart from those policy instruments typically found in each stage of innovation, we can consider patents and public procurement as new instruments as well. These can be more effective in Asia and the Pacific where the COVID-19 crisis has led to higher fiscal vulnerability and a narrower fiscal space.

2. Strong Patent Systems

Patents, as a result of technological innovation, are the leading indicator of economic growth. According to WIPO (2022), a patent is an exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem. Moreover, to get a patent, technical information about the invention must be disclosed to the public. Therefore, patents can play a prominent role in driving innovation not only by providing incentives for innovators with certain exclusive rights and fair returns but also by disclosing innovative information to the public. Key features of

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**Figure 1: Marginal Product of Capital**

Note: $Y$ and $K$ represent output and capital, respectively. In the left figure, when capital increases from $k_1$ to $k_2$, output increases from $Y_1$ to $Y_2$ at a diminishing rate. In the right figure, with higher productivity (red curve), the same amount of capital ($k_2$) yields a higher level of production ($Y_2$).

Source: The graphs are derived from Solow (1956), with graphical guidance from Mankiw (2021) and Sredojevic (2016).

**Figure 2: Interactions between Innovation Ecosystem Stakeholders**

Source: WIPO (2022).
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Patent systems include exclusion, transferability, disclosure, certification, standardization and divisibility (Minna 2021; Nicholas 2021). Exclusion allows markets to efficiently allocate goods and services and, therefore, is necessary for the development of the market for innovation. Disclosure, on the other hand, is important for the expansion of innovation because it accelerates the diffusion of innovative knowledge to emerging innovators. By providing background and existing state-of-the-art knowledge relevant to innovative inventions, it could bring about new innovations.

Historically, patents and economic growth have a close relationship. With the introduction of patent systems, the United Kingdom (UK) (in 1640) and the United States (US) (in 1790) became technologically advanced countries. Similarly, we can find a close relationship between patents and economic growth in the People’s Republic of China (PRC), Japan, and the Republic of Korea (Figure 4).

Asia has both opportunities and challenges in its patent systems. Asia is the global hub of patent filing activity. According to WIPO, in 2020, Asian economy patent filings accounted for more than 66% of the world's total (Figure 5). The top five economies filing patent applications, including the PRC, the US, Japan, the Republic of Korea, and the European Union, accounted for 85% of total global applications in 2020 (Figure 6). This suggests that the Asian economy has great potential for innovation-led growth.

However, there are also challenges. Above all, most patent activities in Asia and the Pacific are highly concentrated in the PRC, Japan, and the Republic of Korea (92% of Asian patent filing activities), while most of the filing activities in other countries in the region are made by non-residents (Figure 7).

In addition to patent filing, technology transfer and commercialization are key factors for innovation development. Technology transfer, which refers to the process of conveying results stemming from research to the marketplace and to wider society, is an intrinsic part of the technological innovation process. Without technology transfer and commercialization, patent filing cannot contribute to economic growth. According to the PRC National Intellectual Property Administration,

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**Figure 3: Evolving Innovation Ecosystem**

Source: WIPO (2022).
the industrialization transfer rate of the PRC’s effective patents stood at about 35% in 2020 (PRC State Council 2021). Even though the rate is increasing, effective technology transfers or commercialization policies are still needed to improve patent utilization and drive higher economic growth, as in the cases of the USPTO and IPOS.

### 3. Innovative Public Procurement

Public procurement is a large share of the global economy and can potentially create large economic impacts. According to the Organisation for Economic Co-operation and Development (OECD), public procurement is a large share of the global economy and can potentially create large economic impacts.
Box 1: Case Study of the United States Patent and Trademark Office (USPTO)

**Accelerated patent examination programs:** “To FAST track your patents: Use Track One!”

Fast innovation is the US’s competitive edge. The USPTO has established procedures to accelerate patent applications, with Track One allowing a final disposition within 12 months. Effective 24 September 2021, the limit on the number of prioritized examination requests that may be accepted in a fiscal year has increased from 12,000 to 15,000.

**Inventor assistance and support programs:** These include an inventor assistance center, small- and micro-entity fees, a Pro Se assistance program, patent and trademark resource centers, a patent pro bono program, a law school clinic certification program, and training and outreach events for small businesses, e.g., through regional offices.

**Intellectual property commercialization (licensing) programs:** USPTO Patents 4 Partnership IP Platform, Federal Lab Consortium Technology Platform, Federal Agency Technology Transfer Offices, University Technology Transfer Offices.


Box 2: Case Study of the Intellectual Property Office of Singapore (IPOS)

Singapore, with its strong rule of law and protection environment, has developed a strong intellectual property system, aiming to be a global hub, along with intangible assets (Walter 2021). After launching its intellectual property hub master plan in 2013, and updating it in 2017, Singapore finally released its Strategy 2030 (SIPS 2030) in 2021 as a growth strategy in the post-COVID-19 period.

SIPS 2030 aims not only to grow the intangible assets/intellectual property (IA/IP) and innovation ecosystem but also considers how IA/IP can be further leveraged to support economic growth and job markets. The strategy focuses on attracting innovative enterprises using IA/IP and developing good jobs and valuable related skills.

procurement accounts for 12% of GDP and 30% of government expenditures, on average, in member economies. Public procurement refers to the use of a substantial portion of taxpayers’ money by governments and state-owned enterprises to purchase goods, services, and work. Therefore, it is expected to meet a high-quality standard in order to ensure decent service delivery and safeguard the public interest.

The role of public procurement is now expanding to achieve strategic objectives and government priorities, including inclusiveness, climate action, the United Nations’ Sustainable Development Goals, digital transformation, innovation, etc. According to the 2019 OECD report on reforming public procurement, member economies increasingly use public procurement to promote secondary policy objectives. According to the OECD surveys in 2014, 2016, and 2018 (Magina 2022), most member economies developed strategic public procurement policies to promote green growth, initiate innovative goods and services, and support small and medium-sized enterprises (Figure 8). Specifically, all OECD economies used green procurement and about 86% are implementing innovation public procurement in 2018.

**Figure 8: Roles of Public Procurement in OECD Surveys (%)**

![Figure 8: Roles of Public Procurement in OECD Surveys (%)](image)

SME = small and medium-sized enterprise, OECD = Organisation of Economic Co-operation and Development.

Note: Each bar represents the percentage of public procurement strategically used to promote secondary policy objectives such as green public procurement and innovative goods and services.

Source: Magina (2022).

Innovation public procurement is a new way of conducting the procurement process. Public procurement plays a prominent role in driving innovation, not only by offering generous market potential for innovative products and services, in particular to innovative start-ups, but also by providing innovative public services, including e-government. Many innovative start-ups face difficulties in financing and marketing in the early stages and often shut down in the first 5 years, the so-called ‘valley of death’. Public procurement can provide stable cash flows to help start-ups survive in the early going. According to the OECD, two different types of innovative public procurement are recommended in different situations. Procurement of innovative solutions (PPI) is recommended when public challenges can be addressed by available innovation solutions, i.e., no new R&D is needed, while pre-commercial procurement (PCP) is preferred when there are no market solutions yet, i.e., new R&D is needed.

**Transformation from efficiency-oriented to innovative public procurement encounters many challenges.** These include management and coordination, skills and capacity, legal and regulatory frameworks, financial support, awareness, and measurement.
Box 3: Case Study of the Republic of Korea’s Public Procurement Service

The Republic of Korea’s Public Procurement Service (PPS) has recognized the importance of innovation public procurement since 2019. In line with the Fourth Industrial Revolution, the Republic of Korea realized the need for new roles of public procurement to respond to the growing importance of innovation, industrial competitiveness, and environmental concerns. In the past, they focused only on efficiency in purchasing government goods and services, small and medium-sized enterprise protection, and certification of ready-made products. On the other hand, with newly introduced innovation public procurement, they have emphasized the creation of an initial market for innovative products, public demand discovery, and innovation procurement platforms. The Republic of Korea revised the procurement act to serve as the first buyer and established a procurement policy review committee in 2020. The committee classified and designated innovative pre-commercial products into one of the following categories: Fast Track I, II, and III. Fast Track I is a group of excellent R&D products existing in the market. Fast Track 2 is a group of innovative prototypes prior to commercialization. Finally, Fast Track 3 is a group of products recognized for innovation by each central government. Each central government can recommend products recognized for public service and innovation even though those products are not newly invented. Each product classified by the committee can be bought at Inno-KONEP, which is an innovation procurement platform. There were 345 and 623 newly designated innovative products in 2020 and 2021, respectively. A total of 968 products were classified into Fast Track I (299 products), Fast Track II (324 products) and Fast Track III (345 products). If the newly designated products match the demand of public entities, PPS supplies them with government contracts within an allocated annual budget for innovative products and services.

User entities and matched innovative products continue to increase every year. There were only 35 user entities joining the pilot use of 28 innovative products in 2019, while these numbers increased to 416 user entities joining the pilot use of 178 innovative products in 2021. The allocated budget for innovative products also increased annually from $2 million in 2019 to $40 million in 2021. Pre-commercialized innovative products are tested and evaluated with feedback until the products meet the required standard and are launched into procurement markets.

Year 2019
35 user entities
joined the pilot use of
28 Innovative Products
Budget: $2 million

Year 2020
290 user entities
joined the pilot use of
66 Innovative Products
Budget: $20 million

Year 2021
Matched 416 user entities to
178 Innovative Products
for pilot use
Budget: $40 million

Source: Eungkeul (2022).

PPS introduced Inno-KONEPS, the innovation procurement platform in 2021. This system links user entities and innovative suppliers by creating demand and providing sales channels.

Source: Eungkeul (2022).

PPS has also operated incubation and PPI scouter programs. To connect conceptual ideas of public entities to Innovation Procurement, expert groups explore and provide solutions to shape their ideas. In 2021, PPS incubated 18 tasks, in collaboration with the Ministry of Environment, on three environmental issues, including carbon neutrality, resource circulation, and water circulation. They also introduced a PPI scouter program in response to the growing need for finding inventive products outside the established boundaries. The scouts identified 35 products and services, including bio-health sectors that were not available in the procurement market.
systems/information technology tools. Among these, the biggest challenge is the risk aversion of government officials (OECD 2017). Innovative products and services can seem uncertain and risky to provide stable public services and sometimes have higher costs than existing procurement. Conservative government officials might be afraid to have an audit after they procure innovative products and services, which makes them risk-averse. Since the Republic of Korea’s Public Procurement Service introduced innovation public procurement in 2019, they have experienced many barriers such as lack of knowledge and expertise; wrong priorities; mismatch with public policies and strategies; and lack of capability to identify innovative solutions as well as risk aversion. It recommended strong political support to overcome those challenges, with the result that the Republic of Korea introduced an audit-exemption clause to lower its risk aversion.


Patent and innovation public procurement systems are two effective instruments to boost innovation, economic recovery, and sustainable growth. In the post-COVID-19 era, many countries in Asia and the Pacific have encountered a fiscal dilemma between reducing fiscal vulnerability and continuing fiscal expansion. Given the monetary policy normalization and higher interest rates, fiscal expansion for economic recovery cannot be a sustainable solution. Innovative approaches for innovation and innovation-driven growth are required. Reform of the existing patent and public procurement system could lead to innovation and growth without excessive fiscal burdens.

- Strong patent systems, including tight patent protection, fast patent examination, and effective information systems, can drive innovation not only by providing incentives to invent new technologies but also by disclosing innovative knowledge to the public.
- Policy makers should intensify policies that connect existing patent systems to innovation, such as improving technological transfer and commercialization rather than policies that only focus on patent system operation itself.
- Strategic use of public procurement can enlarge policy instruments for economic recovery and sustainable growth. Innovation public procurement can promote the government as the first buyer of innovative products and services.
- The challenges of public procurement reforms can be addressed by strong political support such as prioritizing the public procurement policy.
References


