

FOSTERING INNOVATION DYNAMICS AMONG SMEs THROUGH FOREIGN TECHNOLOGY INVESTMENT

KyungJin Hyung

Team Head, Technology Transfer & IP Financing
Korea Technology Finance Corporation (KOTEC),
Gongjak APT B-901, Yeoidaero 6 gil 17, Youngdeungpogu,
Seoul, Republic of Korea (150-729)
Tel (82)10-5608-8500; Fax (82)0505-020-1620
E-mail: kyungjin.hyung@fuqua.duke.edu



Abstract

From a policy perspective, foreign direct investment (FDI) is cognitively differentiated from other sources of capital movement. Governments expect it to bring in technologies and know-how, as well as capital, which will lead the economy to produce higher value-added products and service. Every country hopes to enhance their economy by adopting more innovation, and FDI serves as a primary channel to diffuse such innovation more quickly. In contrast, many papers argue that FDI actually often results in a disappointingly lower-than-desired diffusion.

By touching upon various issues based on the writer's experience regarding technology transfer in and out of Republic of Korea, this paper proposes that fostering foreign technology investment for smaller ventures is more sensible for policymakers in terms of boosting innovation dynamics in the economy in this era of convergence. This paper suggests four pivotal elements to enhance an environment that could attract foreign technology investments that will produce more effective innovation diffusion, use of certification scheme to select the right kind of enterprises to incentivize, enhancing investment-in-kind through establishing globally acceptable technology valuation standard, designing demand-driven technology matching platform, and cultivation of efficient intermediaries that understand technology in terms of business model.

Challenges in facilitating innovation through FDI

From a policy perspective, policymakers expect FDI to bring in technology and know-how in addition to job creation that would contribute to converting their economy to a higher value-added one.

There are two different dimensions on this perspective. The first dimension, the expectation of which is easily assumable, is a productivity increase in conventional industries through quick learning of advanced process management, systematic training for workers to become highly skilled, and the introduction of sophisticated machinery and equipment.

When such a transfer is made through FDI, the expected diffusion which will narrow down the technology gap often happens slowly because it initially comes within the boundaries of wholly-owned

local subsidiaries and joint ventures. It takes time for local firms to absorb it through the channels of competitive hiring of skilled engineers, imitation, and reverse engineering.

Enterprises from advanced economies often try to prevent the leakage of technologies because they are the primary source of competitive advantages to sustain their investment when venturing into a new market. In fact, large-scale multinationals often keep their research and development activities in the home country and try to exploit only cheaper labor costs and incentives provided by the country they are entering. From their perspective, the duration of time such advantage can be exploited will depend upon how long and wide the technology gap can remain.

In addition, international technology transfer that does not involve FDI in

emerging countries is simply a one-way introduction of advanced machinery and equipment, solutions or well-systemized production know-how rather than added value through collaboration and convergence of transferor and transferee in regard to co-creation, adaptation or sophisticated localization efforts. With such a practice, which is more or less like trade in capital goods, only a fraction of the policy intention is achieved.

Some countries attempt to make technology transfer obligatory. Although well-intended, such policy often turns out to be ineffective for three reasons. Firstly, there is fierce competition nationally and even at the local level within the same country to attract big multinationals with advanced technologies and brand power. Second, foreign firms can choose what to transfer and thus they may meet the requirements by transferring old technologies that they do not need in their home country. Third, emerging countries are often not capable of learning and absorbing advanced technologies due to lack of experience and limited capacity.

For example, although Viet Nam successfully attracted Samsung Electronics into their country, Samsung tends to bring in Korean vendors rather than sourcing their supply locally, as Viet Nam lacks the capacity locally to supply sophisticated parts and components. It takes time for Viet Nam to build their capacity beyond packaging and basic manufacturing which takes place in stages starting from basic processes like injection molding, which is old technology in the Republic of Korea.

During the Republic of Korea's period of rapid economic growth, a multi-staged policy approach was effective. However, it is now difficult for other developing countries to emulate the Korean approach as unlike in the past, today the old economy and new economy are developing at an asymmetric pace. China is probably one of the last examples of staged economic planning.

Summary of Idea

THE DILEMMA

Policymakers often think of FDI as a primary channel for boosting innovation. However, the expected transfer and diffusion of advanced innovation may not take place even after incentives are provided. The effect may not be big enough even if it happens. Furthermore, it is hard to plan, execute, and monitor the impact of policy because it is realized over a long period of time.

WHY IT HAPPENS

It is natural for multinational companies to act as *rent seekers* to maximize profit by exploiting policy incentives & low labor costs with limited exposure of new technologies. Talented entrepreneurs are tempted to practice *avoidance behavior*, that is, seek an easier way to make a fortune in today's fast-paced Internet-and-mobile-driven world rather than choosing incremental learning via a more time-consuming path.

THE TACTICS

While keeping FDI policy at a pertinent level for the purpose of job creation and capital injection, it is necessary to think of another channel in the New Economy for the purpose of learning and recreating foreign-born innovation. Create an eco-system where foreign technology can easily be invested into smaller business ventures in the *New Economy* by providing proprietary products or services directly to the market rather than being basic suppliers to giant firms.

THE REWARDS

This approach would not guarantee the successful facilitation of innovation culture unless each element of the policy program is executed pertinently. If the elements work well individually and in line with others, policymakers will secure a higher level of visibility regarding the impact of boosting innovation in a shorter period of time which will lead to better innovation policy planning and execution.

Apple's iPhone is manufactured in large quantities in China and exported to the global market. If the profit margin of the Chinese assembler and Apple in the U.S. are compared, the Chinese assembler gets a much smaller proportion of the overall profit margin. However, China, whose economy grew successfully under staged-planning, from basic industry gradually toward higher value-added ones, can absorb technology and innovation in the end. As a result, domestic producers are now capable of producing high quality smart phones at a reasonable cost. This is not as easy for other countries.

In the twentieth century, each nation consumed goods and services that are in line with the countries' respective levels of economic development. People's desire grew incrementally as their economy did. However, the Internet and mobile technology in combination with globalization in the twenty-first century has brought about the trend that people get to want and consume advanced services beyond the level at which their domestic entities can provide. Moreover, people everywhere share a similar level of information and desire irrespective of degree of their nation's economic development.

This phenomenon proves an incentive to talented local entrepreneurs to become

traders rather than *creators*. Few talented entrepreneurs are willing to invest the time and passion over a long period of time to advance their business with innovation like research and business development (R&BD). Rather, they tend to carry things that prove to be popular in the advanced world and sell. Some create wealth quickly in that way, while other entrepreneurs try to copy the strategy. A few will stay in the conundrum of serious innovation. I wish to call this *avoidance behavior*.

Governments in developing countries give incentives for FDI because FDI serves as a primary channel for creating jobs, attracting capital and increasing exports. Economic growth in the short term surely contributes to higher consumption power. Talented domestic entrepreneurs quickly bring in foreign products and services instead of trying to learn advanced technology and innovation. However, if technology and innovation are not diffused locally, quite a large part of the surplus is transmitted back to the advanced world as a result.

In this circumstance, it is very hard for policymakers to design policies that would bear the desired impact in the long run. In addition, FDI satisfies some policy expectations such as job creation as well as an immediate increase in capital investment. Thus, transfer and diffusion

of innovation often loses the attention of policymakers when the FDI is completed. That it is difficult to measure the impact of FDI over a long period of time results in policy-makers maintaining their distance from upgrades in innovation capability through international technology transfer through FDI.

On this topic, the vast majority of the studies deal primarily with the relevance of expecting FDI as a primary channel for technology transfer. Many of them argue that technology transfer is relatively effective when such transfers are made vertically (Carol *et al.*, 2015). Furthermore, most of the research found that technology diffusion or knowledge spillover is not an automatic process. However, few papers propose advice for policy-makers in shaping predictable and malleable strategy for boosting innovation through foreign investment.

This paper is primarily focused to propose the idea that there is another possible cohort of firms, innovative SMEs, other than big multinationals that is possibly better suited for the purpose of fostering innovation in developing countries through direct interaction. The next chapter will illustrate my reasoning behind this idea. This paper will then address several policy measures that were proved to be successful in enhancing innovation dynamics on SMEs dimension in the Republic of Korea. Finally this paper will draw implications for applying the Republic of Korea's policy programs to facilitating infrastructure for the purpose of drawing the desired kind of international technology transfer to boost innovation.

Rise of the new economy and implications for international technology transfer

We tend to regard motivation for technology transfer in the same light as with the reasons for patenting, freedom to operate in a certain business domain - protection of proprietary products or defense from lawsuit. For big multinational companies active both in developing and acquiring technologies, it is actually true. For many smaller firms, the motivation may be different.

The organization that I work for, Korea Technology Finance Corporation (KOTEC), is a special financial institution dedicated to funding SME business projects driven by technology or other sources of innovation through debt guarantee and equity investment via its own unique proprietary rating and valuation system.

I worked in the international business department from 2012 to 2014, where my primary task was to promote the transfer of establishing KOTEC's rating and valuation system to other countries such as Viet Nam, Thailand, and Hungary, a program which is still going well. The other task was to establish channels and programs for international technology cooperation including technology transfer between tech-related SMEs in the Republic of Korea, KOTEC's client firms, and foreign enterprises from both developing countries and developed ones. The latter task has progressed a lot more slowly despite huge efforts.

In 2014, KOTEC's newly established technology convergence centers designed to provide technology transfer intermediation and IP financing in the Republic of Korea. I was assigned as a team head for the Seoul technology convergence center in January 2015.

In 2015, my team and I, three people in total, closed thirty-one technology transfer deals, namely technologies from universities and research institutes to SMEs in the Republic of Korea. Among the thirty two, eighteen were to identify and execute new business opportunities. Although many technologies were patented, there was no guarantee that transferees could protect their product or service simply by having those patents because most of those technologies were not source technologies, but application technologies that have room for detouring¹.

Ten were to seek R&D partners either for market-based collaboration or for forming strong candidacy for government-backed research projects. The rest were to attain credibility. Small businesses often lack

brand recognition and thus, they intended to promote their products with patents under the name of universities or research institutes. This pattern of purpose distribution continues to be the same in 2016 up to when this paper was written.

Although this may not yet prove significant from the perspective of statistics due to a shortage in samples and in observation time, it is proof that there exists a new dimension that is not well considered by policy makers: certain type of technologies and innovative ideas are more easily transferrable and have potential for serving as a catalyst from which new types of innovative enterprises can evolve.

Smaller business ventures that seek an innovative edge would form an industry under the new economy that deserves separate policy attention. When it comes to the new economy, popular misconception may be that these types of business ventures are primarily Internet or mobile driven ones.

Although it is in large part true, the new economy is not limited to the so-called digital economy, but more for convergence between formerly separate industries. Most technology transfers that I recently dealt with had the following three characteristics in common:

- Transferees look for heterogeneous elements to be combined with their existing products for creating/tapping new markets or new demand;
- Those technologies have a relatively short life cycle, which means new application technologies are continuously generated as usage increases; and
- Convergence often comes from direct collaboration between the technology supplier and technology demander.

To better illustrate, I would like to introduce a recent technology transfer case example, IOYS² in Republic of Korea. The company was established in 2014 to make 3D figures for consumers. The company figured out how to get high quality 3D real images

by allocating 100 DSLR cameras at different angle. Once a person gets into one of their studios, 100 cameras take each shot simultaneously. The image goes through a rendering process. It takes several hours because the software they are using is not perfect in getting full texture, and thus needs the touch of designers. When the image is corrected and filled, the company prints the figure using 3D printers.

Neither the software nor the 3D printer is the company's proprietary technology. The company figured out an innovative way of taking the highest possible quality 3D image by deploying 100 cameras at certain varied angles which reduces the time needed to take a photo compared with currently available 3D image scanners.

The company was initially looking for software technology to reduce time for rendering that includes image correction by human touch. During the course of collaboration with research institutes, the company recognized plenty of other creative ideas for new business models using other heterogeneous technologies. For example, they could develop a 3D image platform where users not only keep their own 3D images, but also create secondary images by blending various digital impacts such as motion data. Users can create video clips by mixing their 3D images with the dancing motions of famous singers.

The other business is mixing artificial intelligence (AI) technology with figures. For example, a woman had a 3D figure of a famous singer she liked made so that she could actually interact with the figure using AI technology with voice and face recognition function. She was able to play with the figure interactively by conversing and asking it to sing a particular song for her. If this figure could be connected with IoT sensors, she could order the figure to do certain tasks such as turning off the light by simply telling it to do so.

Some people may argue that policy to foster technology transfer should aim ulti-

¹Two cases, one biotechnology and the other inspection technology for organic foods, had strong potential for patent protection; however, these two transfers were also seeking new business opportunities.

²See <http://www.ioys.co.kr/#!news/uhal2> for reference.

mately at the absorption of the transferred technologies. However, when more value comes from creative application compared to learning how to replicate the element technology as transferees' own and those technologies are evolving on a fast lifecycle, it would be better to foster the creative usage of earned technologies. This is different from simply importing and selling finished products because the practice fosters secondary innovation and ideas for better application which the transferee can then turn into its own proprietary asset.

Most developing countries mention IT as an important strategic industry to nurture. However, few countries show realistic progress in terms of policy execution. This hinges in part on the complexity of IT industry with three different waves.

The first wave of IT, during the 1960s and 1970s, automated individual activities in the value chain, from order processing and bill paying to computer-aided design and resource planning (Michael and Millar, 1985).

The rise of internet, with its inexpensive and ubiquitous connectivity, unleashed the second wave of IT-driven transformation, in the 1980s and 1990s (Michael, 2001). This enabled coordination and integration across individual activities; with outside suppliers, channels, and customers; and across geography. These two waves enhanced productivity gains and growth in efficiency across the economy. The elements in these two waves are easily gained through purchase and external sourcing.

Now, in the third wave, IT is becoming an integral part of the product itself. Embedded sensors, software, and connectivity in products – computers are being put inside products, coupled with a product cloud in which product data is stored and analyzed and some applications are run, are driving dramatic improvements in product functionality and performance.

It is easy to misconstrue that developing countries can gain from merely increasing the production capacity and investment in R&D will lead to development of the IT industry. This is far from reality. For sensors and other hardware elements, some countries may gain a competitive advantage by producing those high-quality sensors at a lower cost. However, the third wave

of IT-driven competition is more about a creative service model, while source technologies and key algorithms are already dominated by global giants.

Extensive amounts of new product usage data enable many of those improvements. Producing them will reshape the value chain yet again, by changing product design, marketing, manufacturing, and after-sale service, and by creating the need for new activities such as product data analytics and security. This will drive yet another wave of value-chain-based productivity improvement. The third wave of IT-driven transformation thus has the potential to be the biggest, much bigger than the previous two (Michael, 2014).

In new fields such as Internet of Things, Big Data, Cloud, Artificial Intelligence and Virtual Reality, it is hard to foresee how developing countries could gain an edge by starting from efforts to earn and create source technologies. It doesn't make sense for a country to attempt to sequentially build industries that would buttress these three waves.

For small and medium sized business ventures, value comes largely from generating an innovative service model out of creatively combining smart and connectivity elements into their existing products and services. The good news is, thanks to the advent of the Internet and mobile technology, information is shared in real time all around the world as aforementioned and global sourcing of technology becomes easier.

Using technology or adopting innovation is a habit of entrepreneurs as well as a culture policymakers should look to boost through having the right ecosystem. The next chapter will explore types of innovations and value capturers to infer more predictable and malleable policy target area.

Carving out a realistic policy niche to foster innovation in the new era: Types of innovation and entrepreneurs

Clayton M. Christensen from Harvard Business School conceptually categorized three different types of innovations (Clayton and Bever, 2014):

- Performance-improving innovations;
- Efficiency innovations; and
- Market-creating innovations.

Performance-improving innovations replace old products with new and better ones. They generally create few jobs because they are substitutive. Efficiency innovations help companies make and sell mature, established products or services to the same customers at lower prices. Market-creating innovations transform complicated or costly products so radically that they create a new class of consumers, new applications, or a new market.

Conventional FDI may bring about a productivity increase in the first two categories of innovations. However, it normally has weak ties with the third category.

Figure 1 shows four different types of value capturers that I conceptually discovered. I put those four types into a quadrant by taking the vertical axis as the degree of value creation potential and the horizontal axis as the degree of novelty in original innovation. Here the value creation refers to the whole economy, and novelty represents originality of innovation.

Originators are those who come up with original technologies through R&D or ideation. They have high potential to create value for the economy with innovations possessing a high level of novelty. Adopters are the ones who simply borrow the innovations from originators for the products and services that the innovation is originally designed to address and thus, novelty is maintained.

Convergence catalysts are those who try to figure out new applications of the original innovation in an attempt to create new markets and new consumers. They create and enhance the value of original technologies by integrating them into a disruptive business model or combining them with different innovation. These enterprises are active in undertaking secondary or application-level R&BD activities. Companies that create new markets tend to generate more new jobs.

Traders are those who simply buy and sell products or services created elsewhere only to earn a margin by adding limited value in terms of fostering a national economy to be innovative.

From the perspective of innovation policy, conventional FDI may have an impact on productivity increase by adopting innovation practiced and proven in an advanced economy. Cultivating originators is difficult and requires patient investment in the economy.

Incentivizing talented entrepreneurs to become convergence catalysts by leveraging foreign-born innovations, not trading, is a realistic innovation policy area and may have a bigger impact in creating innovation dynamics in the economy. If such dynamics are created, it also helps to increase qualified originators because their practice of creatively using innovation functions as a feedback loop that provides better inspiration for them to come up with sensible innovations with higher commercialization potential. In short, it fosters a virtuous reinforcing cycle. The next chapter will introduce key elements used in Republic of Korea's ecosystem for promoting innovation dynamics.

Critical factors to foster FTI

Aligning incentives with the right to-be-innovative enterprises

Most countries have incentive programs for innovative enterprises or R&BD activities under targeted categories like 6Ts³. Technology, as well as innovation, is a broad concept, and probably any company could describe itself as innovation-driven or technology-oriented.

The first thing that policymakers should consider before establishing incentive programs is to establish a systematic process of selecting and certifying the right type of entrepreneurs with the right potential, proper willingness and capability to carry out innovation-driven business. When it comes to the selection process, it would be better to do so using standardized evaluation criteria that take granularity into account with the least possible amount of subjectivity.

During the late 1990s, the Korean government initiated the Venture Certification system for venture companies to select the firms with high growth potential from the application of new business ideas or tech-

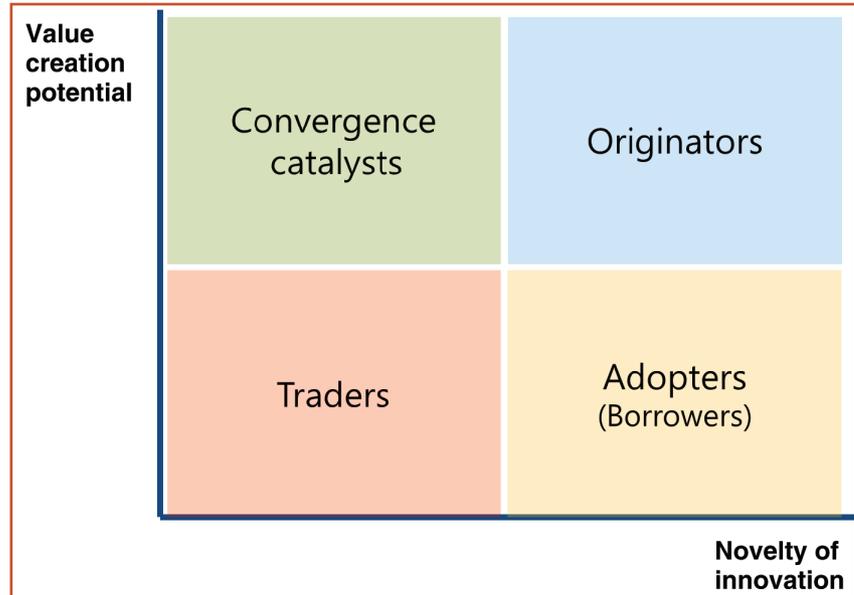


Figure 1: Innovation quadrant

nologies. The venture certification system was designed to prepare for the era of the knowledge-based economy by directing potential entrepreneurs' attention to the concept of the new economy by providing consorted support in accordance with the Act on Special Measures for the Promotion of Venture Businesses (September 1997).

From the early 2000s, the Korean government began to take a more concrete 'choice and focus' approach between general SMEs and ventures in terms of policy treatment. These efforts have shown success with R&D expenditure by SMEs growing fivefold between 1997 and 2006, when it accounted for 24% of all total firms R&D expenditure. By 2006, 43% of all researchers worked in SMEs, up from 24% in 1997⁴.

Similar to this example, policymakers in developing countries can establish a certification system for enterprises which have growth-potential by learning and re-creating technologies in advanced economies.

Invigorating investment-in-kind practice

If companies are certified as a venture company, the special law allows the firm to receive technology as capital investment.

If the venture hopes to adopt technology from a different entity, the technology is evaluated by credible valuation specialists and the value which is the outcome of such valuation can be treated as equity investment.

If developing countries facilitate such a credible and professional practice using globally admitted methodologies, foreign entities that can provide technologies can have easier access in forming joint ventures or in regard to technology investment. This practice is different from technology licensing which primarily takes a certain proportion of sales revenue whether or not the adopting company is successful or not. In case of investment-in-kind, the technology provider is better off only if the enterprise's equity value goes up, which means the venture will eventually be a success.

Investment-in-kind is widely practiced among venture-certified enterprises in the Republic of Korea and normally fosters a deeper commitment by technology providers and more shared risk.

The pivotal element for an investment-in-kind scheme is to secure credible and globally acceptable valuation practices. In

³IT, BT, NT, ST, ET, CT

⁴See p10, Terence O'Donnell (2012). "South Korea SME Innovation Support Scheme", European Commission, April.

the Republic of Korea, KOTEC provides the majority of valuation services for ventures for the purpose of investment-in-kind. The Malaysian government established a standardized valuation methodology in 2014 as a national scheme and seeks to use it for international technology transfer, as well.

Demand-driven information platform

Every country hopes to promote technology transfers. What governments normally do is to establish a technology information platform by collecting and integrating information from technology holders.

In the Republic of Korea, there are plenty of such information platforms. In particular, the National Technology Bank (NTB) is the largest aggregator of transferable technologies, while other institutions have their own technology database that is easily accessible to anyone. The underlying assumption is that demanders can find and match their needs by browsing such information provided mainly by inventors. However, not every demander is R&D intensive enough to understand the technology described by researchers. To solve this problem, NTB provides a summary written in an easier format, although this too remains insufficient.

At the end of 2014, Korea Technology Finance Corporation established a demand-driven platform named KOTEC Technology Matching System (KTMS). KOTEC is a financial institution dedicated to ventures and other technology SMEs, and it frequently interacts with its 70,000 clients during initial consultation and due diligence for technology business evaluation, and even after funding.

The organization is well-positioned to get to know venture companies' technology demands and thus started to file such demand information. Because KOTEC has the capability to understand both technology and business, their staff is able to better identify, articulate, and communicate demands from ventures. The organization systemized the idea into a platform and technology suppliers were naturally attracted to provide their technology list to the platform. In addition to integrating

convenient functions for KOTEC's staff by integrating the function of sending search requests with demand information to a technology holder with one click, KOTEC allowed technology holders to log in and browse demand lists so that two-way matching could take place.

Toward the end of 2015, the platform further evolved in terms of function, as it became able to store a critical mass of demand and supply information. Now, a curation-based recommendation algorithm has been integrated into it so that demand and supply could be matched by keywords and indicators to help users immediately obtain refined information.

It is too early to place statistical analysis on the impact of KTMS precisely. Simply put, KOTEC's total number of technology transfer intermediation soared from 43 cases in 2013 to 262 cases in 2015. In 2016, it is targeting 400 cases.

If a developing country can replicate this type of platform that has well-expressed demand thanks to experts who understand technology and business in English, I believe there will be a plentiful amount of supply technology information to be matched from all over the world. Europe has the European Enterprise Network, while the ASEAN Economic Community will build something like this eventually around technology cooperation. This trend will work favorably toward countries that are prepared for the economic integration of the Asia-Pacific region early on.

My team and I serve WIPO (World Intellectual Property Organization) Green as advisory board members. We advised WIPO to adopt a demand-driven approach by searching demand first for green technologies, as well as aggregating green technology solutions from all over the world, an initiative which is progressing. WIPO Green gathered demand information from Canada and Kenya recently and is experimenting with targeted matching with KOTEC's team and other partner institutions all over the world.

Training the right intermediaries

When it comes to technology transfer, most experts in many countries are patent

lawyers or technology specialists. These are the right people for the purpose of conventional technology transfer practice; gathering patents to secure safety against potential lawsuits from third parties, trolling, or multinational buying and bulk selling technologies in accordance with their strategic roadmap.

If technology intermediation is for smaller ventures to seek a distinguished edge through international transfer, the experts should be the ones who understand both technology and business in a balanced manner. When I worked with Vietnam's State Agency for Technology & Innovation (SATI) to foster technology cooperation among SMEs in Republic of Korea and Viet Nam, I frequently heard their experts saying that Vietnamese firms always emphasize their need for technologies, but few can articulate what they need when asked.

I believe this can be solved when the intermediary can better understand each country's pain-points and communicate them in line with business strategy. An intermediary that is capable of helping entrepreneurs realize what they specifically need and convert the need into the right technology language is also a critical part of the FTI scheme's success.

Conclusion

Policymakers in developing countries attempt to attract FDI from advanced economies with the expectation that they can boost innovation quickly by learning as well as creating jobs and injecting capital.

In the past, initial dependence upon FDI made sense because it was easier for policymakers to periodically plan staged growth from basic industries to higher-value added sectors in an incremental manner. However, the advent of the Internet and mobile technology complicated the policy landscape by making it much harder to design and execute a staged growth plan. Now, policymakers are poised to deal with growth in different dimensions simultaneously.

The good news is that disruptive innovation these days often comes not directly from technology per se, but more from the creative secondary use of such technology

by creating convergence or a disruptive service model. Thanks to the Internet, mobile technology and globalization, technology is getting easier to source from elsewhere.

Smaller ventures that try to serve a market directly rather than being a part of the supply chain for a specific global company are the ones that policymakers have to pay sharp attention to. If they could establish an ecosystem that fosters the flow of advanced innovations from foreign countries to be utilized by the right type of local enterprises and direct collaboration around such innovation, this may help an economy have the desired innovation dynamics.

This paper suggested several key elements such as certifying and incentivizing the right kind of enterprises to do such a task by creating a credible and globally acceptable technology valuation practice, establishing a demand-driven platform that can be connected to global technology supply information, and the cultiva-

tion of effective intermediaries who can interpret unarticulated business needs into technology demand.

In every strategy planning, predictability and malleability matter and I hope this paper will give a useful insight to policymakers in targeting the right spot in the complex innovation landscape

References

- ✓ Carol Newman, John Rand, Theodore Talbot, Finn Tarp (2015). "Technology transfers, foreign investment and productivity spillovers", *European Economic Review*, Vol. 76, pp. 168–187.
- ✓ Amy Jocelyn Glass and Kamal Saggi et al (2008). "The Role of Foreign Direct Investment in International Technology Transfer", *International Handbook of Development Economics*.
- ✓ Beata S. Javorcik (2010). "Foreign Direct Investment and International Technol-

ogy Transfer", *Encyclopedia of Financial Globalization*.

- ✓ Michael Porter and Victor Millar (1985). "How Information Gives You Competitive Advantage", *Harvard Business Review*, July, pp. 149–174.
- ✓ Michael Porter (2001). "Strategy and the Internet," *Harvard Business Review*, March, pp. 62–78.
- ✓ Michael Porter (2014). "How Smart, Connected Products are Transforming Competition", *Harvard Business Review*, November, pp. 66–88.
- ✓ Clayton M. Christensen and Derek van Bever (2014). "The Capitalist's Dilemma," *Harvard Business Review*, June, pp. 60–68.
- ✓ IDEA WATCH (2014). "The Real Cost of Patent Trolls", *Harvard Business Review*, November, p. 32. ■

World Investment Report 2015

This year's World Investment Report, the 25th in the series, aims to inform global debates on the future of the international policy environment for cross-border investment. The World Investment Report tackles the key challenges in international investment protection and promotion, including the right to regulate, investor-state dispute settlement, and investor responsibility. Furthermore, it examines the fiscal treatment of international investment, including contributions of multinational corporations in developing countries, fiscal leakage through tax avoidance, and the role of offshore investment links. The Report offers a menu of options for the reform of the international investment treaties regime, together with a roadmap to guide policymakers at the national, bilateral, regional and multilateral levels. It also proposes a set of principles and guidelines to ensure coherence between international tax and investment policies.

The report shows that Foreign Direct Investment (FDI) inflows in 2014 declined 16 per cent to \$1.2 trillion. However, recovery is in sight in 2015 and beyond. FDI flows today account for more than 40 per cent of external development finance to developing and transition economies.

For more information, contact:
United Nations Publications Customer Service
C/o National Book Network
15200 NBN Way
PO Box 190
Blue Ridge Summit, PA 17214, USA
E-mail: unpublications@nbnbooks.com
Web: <https://unp.un.org>