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Conceptual Framework of Country Innovation Capability Development: Case from Japan, Korea and India

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Abstract
The capacity to innovate is a key to competitive advantage. The successful transformation of Japan, Korea and India from merely with imitative capability to move up to value chain into advance innovation capability was reviewed. Based on the case of Japan, Korea and India, we can identify four factors play key role in the development of innovation capability. The first one is government involvement. The second one is the availability of competence human resources. The third one is financial capability. The fourth one is sizeable domestic market. Two moderating factor are identified. The first one is exposure to the outside world and the second one is turning point or crisis.

Key words: Capability, Innovation, Transformation.

1. Introduction

The capacity to innovate is a key source of competitive advantage (Tid, Bessant, & Pavitt, 1998). Innovation capability defined as the ability to come up, consistently, with novel ideas that deliver short and long term profits to an organization. (General Management Review from http://www.etgmr.com/jan_mar05/Innovation.html on April 8th 2017).

The successful transformation of Japan, Korea and India into innovative countries follow common trajectory of late comer strategy in building innovation capability which start with duplicative imitation followed by creative imitation, rising up the value chain into innovative product creation (Kale & Little, 2007). Despite of several differences, such as policy on Foreign Direct Investment, strategy in fulfilling the need of qualified resources, we can see that most of them have quite similar characteristic. The similarity includes, such as, start with imitation with reverse engineering, strong government intervention, financial support, fulfilling the need of qualified people and sizeable domestic market for first creation product.

This writing will review the case of the development of innovative capability in Japan, Korea and India. Based on the case of the three countries, a conceptual framework of countries innovation capability development is suggested.

2. Turning point of Innovation

Many innovation initiatives started with turning point. In the case of Japan, Korea and India, all of them had 2 important turning points. The first one is transformed them to start the basic innovative capability (to make minor adaption to production and to assimilate technology into a firm environment) and the second one transform them into the advance innovative

capability (the ability to generate new products and process innovations)(Kale & Little, 2007). The case of Japan, the first turning point to innovative capability was built the post war. Japan was forced to rebuild their economic after losing the war. The spirit to build the economic of the countries after losing the war and choosed to be industrialist and the strategy is followed the basic innovative capability by Kale and Little (2007) which is imitative capability. The second turning point was in around 1972 when Japanese faced the technology embargo. At that time manufacturer from US feared that selling technology especially electronic and genetic engineering will be imitated. Therefore, Japan made a national consensus that Japan should change her policies for science and technology from emphasizing imitation to innovation (Shishido, 1983).

In Korea case, the first turning point was after independence in 1945, Korea entered a period of turbulence, culminating in the civil war which broke out in 1950. The separation of the country further devastated the Southern economy. The North was the dominant region for industry, including energy supplies, which were cut off. This situation determined the development of industrialization. Asian crisis in early 1990 became the second turning point for Korea. The crisis pressured for liberalization and opened up policy. This created more investment capital (Hira, Morfopoulos, & Chee, 2012).

For India case, which the case of pharmaceutical is used, the first turning point was in 1970s when the government declared to decrease the dependency on foreign pharmaceutical firms. This created the opportunity of domestic pharmaceutical company to imitate the compound which enabler with the weak implementation of patent act. The second turning point was when India signed the TRIPS (Trade Related Aspects of Intellectual Property Rights) agreement which led to the strict patent law implementation from 1995. This agreement restricted the reverse engineering R&D by India firm and forced the initiatives for incremental innovation in technique of product design, quality and production processes (Kale & Little, 2007).

From the experience of the turning point, it can be suggested that deep crisis might cause people to take a great leap forward and willingness to accept the inevitable.

3. Strong involvement of government in the early phase

In all three countries, there was strong involvement of government in the early phase of innovation capability. This includes the support such as in financial, R&D, protection policy. In Japan the government involvement started way back in Meiji era, which required the imported technology from Europe and North America. This technology dependent was in the form of employing foreign engineers and craftsmen, importing plants, machinery and raw material to build modern industries. The state also invests in the establishment of state firms for those technology adaption. Government also built the technology research centers. Financial support was provided by government to various research facilities. Improvement in education system was also prioritized (Shishido, 1983)..

In Korea, the government involvement was at the firm establishment. Most of the chaebols were invested by state firms. They started with supplying government project, mostly military project. Government pushed the agenda for an independent economy. The usage of luxury items were banned and held down food prices which indirectly subsidized industrialization. Other policies such as education, technology transfer and control of imported products helped the flourish of innovation capability (Hira et al., 2012).

Pharmaceutical industry in India flourished into current position was also because of government intervention. First with the policy of Drug Price Control Order which limited the price of patented products. Second is the weak patent act which enables India domestic pharmaceutical company to imitate patented products. Third one was policy to reduce the ownership of foreign pharmaceutical company only to 40%. Those policies provide opportunity in competition and also access to knowhow of drug production. India government set up research institute (Kale & Little, 2007).

The role of government in those three countries especially in the early phase are in financing, providing policy for protection, providing competence labors and also participating directly as early innovators. Government realized that innovation involved high risk, therefore in the early phase private firms cannot be expected to bear all the risk, government should support them with bearing the risk. In all those three countries, the intervention of government will be more loosen when the industries were considered strong enough.

4. The importance of availability of competence human resources

The importance of competence human resources for innovation capability was recognized in Japan, Korea and India. In Japan, they first employing the foreign engineering and craftsmen as sources of new technology know how. Under direction of foreign technicians, Japanese workers trained and when qualified will become instructors. Government also sent scholars to study abroad and they initiated their own originals courses. Japan has a high standards of education. Even at the beginning of the Industrial Revolution in Japan, the level of education was considerably higher than that in many of the developing countries today (Shishido, 1983)..

Education improvement was also one of the agenda of Korean government during the industrialization transformation. Government made major improvements in education, moving Korean literacy from 40% in 1953 to over 90% in 1987 (Hira et al., 2012).

Since the 1950s the Indian government has set up a vast and diversified network of R&D institutions under the umbrella of the Council of Scientific and Industrial Research (CSIR). CSIR consists of 43 national laboratories employing around 10,000 highly qualified scientific and technical personnel. In India in availability of competence human resources was also fulfilled by employing Indian pharmaceutical firms filled the knowledge gaps by hiring Indian scientists experienced in drug discovery R&D and by adopting a strategy of collaborative research with Indian and overseas research institutes. Five point five per cents of students studying outside their home countries is from India (Fu & Soete, 2010). Literacy rate was improved from 41% in 1980 to 66% in 2007. India set up seven Indian Institute of Technology starting in 1950s and later several Indian Institute of Management, which produced critical mass of well-educated English-speaking professionals.

5. Financial capability

In R&D, it is no questions that financial support is needed. In Japan, government helped financing the R&D activities with the establishment of various research council and research center such as chemical and physical research laboratory in 1917 and set up a number of new industrial research institutes, these included the (temporary) Nitrogen Laboratory (1918), Osaka Industrial Laboratory (1918), Textile Industry Laboratory (1918), Porcelain Laboratory (1919), and the Monopoly Bureau's Central Laboratory (1920). Japan did not depend on Foreign Direct Investment since Japan is quite strong in saving (Shishido, 1983)..

In Korea, the structure of chaebols and their close relationship with Japanese counterparts allowed them to have low interest rate and lower than market price raw materials. At the early phase, the state was also owned the firms, it gave the flexibility to the firm to extensive R&D activities even the high risk one. After the crisis, when financial transparency and liberalization were enforced, this gave another opportunity financial support through foreign direct investment through stock market (Hira et al., 2012).

In Indian Pharmaceutical Industry, Government supported the R&D activities. In 1995 under the Department of Science and Technology, the Indian government launched a programme called the New Millennium Leadership Technology Initiative (NMLTI) to bring industry and academia together. The NMLTI programs has financial outlay of Rs 800 million. In this programme 50% of funding comes from the government and 50% from industry. Initially Indian firms faced major constraints such as financial and infrastructural resources. The alternative strategy to cover these financial costs was to partner with MNC pharmaceutical firms through licensing of molecules or drug delivery system technology. These licensing agreements usually involve milestone payments and limited marketing rights (Kale & Little, 2007).

6. Exposure to outside world

In Korea and India cases, foreign direct investment not only provides the financial support, but it also introduces the countries to the "new", new products, new technology and new processes. This provides the know-how of product imitation (as the first phase of these three countries innovative capability phase).

The next phase, the openness to outside world through loosen up the protection, export focus, will tighten the competition. The competitiveness and more strict patent act, will further challenges Japan, Korea and India to move up the value chain from merely imitate to innovate.

7. Sizeable Domestic Market for initial products

During phase of basic of innovation, in Japan the mere existence of a large home market, represented by a population of 30 million at the beginning of the industrial revolution, has encouraged the development of new products and manufacturing processes (Shishido, 1983).. Domestic market also support LG Korea during the first introduction of radio transistor. Without the domestic market to support it, the product will be a failure for nearly brankrupt LG (Hira et al., 2012). India is the market for more than 1 Billion people is a huge market for pharmaceutical industry (Fu & Soete, 2010).

8. Conceptual Framework for the development of countries innovative capability

Based on the experience of the development of innovative capability in Japan, Korea and India, it is suggested the conceptual framework of countries innovative capability. First the government involvement is important in countries innovative capability. Government role can be providing the direction and priority of specific industrial to be develop, protection during the first stage of innovation capability development, the policy for technology transfer and also providing financial support. Second is the availability of competence people. This can be achieved mainly with improvement of education system. Training and learning from foreign expert might be other way of providing qualified people. Third key factor in developing innovative capability is financial capability. Financial support is important in R&D. Foreign

direct investment might influence both in financial and also technology transfer. The Fourth factor influencing the developing of innovative capability is availability of sizeable domestic market as the market of the early stage of invention.

There are two moderating factors the first one is exposure to the outside world. It might influence differently in the difference phase of the innovative capability development. In the early stage, in the learning curve, protection is necessary particularly in the imitative stage. The exposure to the world might be contra productive. In the advance stage, exposure to the outside world, to the competition, will encourage for better quality, efficiency and advancement. The second moderating factor is the turning point or crisis which will fasten the development of innovation capability.

9. Conclusion

The capacity to innovate is a key source of competitive advantage (Tidd et al, 2005). Innovation capability defined as the ability to come up, consistently, with novel ideas that deliver short and long term profits to an organization. (General Management Review from http://www.etgmr.com/jan_mar05/Innovation.html on April 8th 2017). Based on the case of Japan, Korea and India, we can identify four factors play key role in the development of innovation capability. The first one is government involvement. The second one is the availability of competence human resources. The third one is financial capability. The fourth one is sizeable domestic market. Two moderating factor are identified. The first one is exposure to the outside world and the second one is turning point or crisis.

The limitation of this writing is that this is based on the review of three-country cases. Further study should be done to provide empirical data to support the conceptual framework.

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