

Emerging Economies of East and South East Asia: Some Salient Points about Technology's Role in Economic Development

Elias Sanidas

*Department of Economics
Seoul National University
South Korea*

This area of East and South East Asia is characterized by the following traits: very large population; tendency and ability for detail; imitation rather than creation; ability for organization; tendency for corruption; tendency for autocratic regimes; in the process of an industrial revolution; technological imitation; nationalism without boundaries; wide range of GDP per capita and poverty; litter and pollution problems without solutions; natural disasters; exports oriented; high urban development; Chinese culture influence; FTAs (Free trade agreements) and ASEAN; FDI rather high; disparities between East Asia and other Asian areas; production networks through Japan's and South Korea's roles in international division of labor.

In this short paper we will pay more attention to only one aspect of the above list, namely the very important issue of technology in this region. In general we have the distinction between process innovations versus product innovations; or organizational (OIs) versus technical innovations (TIs). Asian countries are more innovative with OIs, e.g. just-in-time (JIT) and quality control (QC) which started in Japan (see Sanidas, 2005). Let us review the case of Korea. By 1976 we had the introduction of mass production by Hyundai and export-led regime. This was also equivalent to mass production but flexible at the same time; mass exports; low wages and high productivity, hence Fordism was present to some degree. Once South Korea reached the critical point of development, then we had mass flexible production, mass consumption, high wages and high productivity (Kim, 2012).

Through preferential loans and sanctions, government intervention facilitated chaebols, the Korean conglomerates such as Hyundai and Samsung. Gradually, we had a government-led economy and at the same time a corporate-led economy. The 1997/98 Asian Financial Crisis corrected the exaggerated domination of chaebols (until the crisis many chaebols did not have a healthy governance). Hence a more shareholders oriented corporatism appeared in the 2000s. Overall, knowledge, education, training, human capital, a balanced and healthy cooperation between government and big business, and a fair distribution of income have been the cornerstones of South Korea from the start. In addition, through all these aspects, both TIs and OIs were developed at a highest level in this country.

The question as to the choice between TIs or OIs is similar to the following questions: Embodied or disembodied technology? Imported or indigenous? Based on tacit or explicit knowledge? In which sectors? Is comparative advantage considered? What is the relative intensity of factors of production in each country? Is the industrial structure considered? What type of competition prevails in the economy/society? Overall, development is due to capital and technology and to skilled labor. It takes time and necessitates a careful choice of economic and social policies, especially during the basic and take-off periods!

The choice of TIs (e.g. a new machine) and OIs (e.g. JIT) in developing countries is very crucial. For example in Indonesia (Hill, 1997), concerning the choice between (i) the hand loom; (ii) the fully automatic loom; and (iii) the intermediate mechanized loom, the latter might be the best choice as it is economically efficient across a wide spectrum of wage and interest rates. In this regard, see also Schumacher's classical book "Small is beautiful", in which the author provides many examples of innovations suited to developing countries. The concept of capital stretching is also relevant here, whereby we may adapt imported equipment and processes to make more labor-intensive modifications to this imported technology.

In addition, some other questions arise: to which extent, how, and when (East) Asian countries have followed the road to knowledge and wisdom? How is capital expressed in these countries? How is the diamond of knowledge which is a combination of all four major processes of business background (those of wisdom, strategies, movements, and contracts) expressed in these countries? (Sanidas, 2006; 2004). What are the prospects for (East) Asian countries in terms of innovations, technology, and economic development? What is the political economy of development in these countries? For each country the path is different. But some common points are important. Strong religions have influenced the way of thinking. The "West" had some impact; see historically how the "West" physically penetrated regions of China and forced Japan and China to open up. See also the role of Japan in the area since the late 19th century. The Chinese language and writing had a big impact. However, mass education, knowledge and wisdom only started after World War II (WWII), contrary to the "West". Thus, the process to wisdom has been since the WWII the main force in most East Asian countries.

Some answers to the above questions are as follows. For example, foreign firms usually possess brand-name advantages over their domestic competitors. But this is not always true, because sometimes citizens of a country are patriotic and want to buy only national brands (for example this happens in Korea and Japan). Almost all R&D occurs in OECD countries. Most multinational corporations (MNCs) headquarters are in OECD countries. Most modern original technology comes from some developed countries (the USA, Japan, Western Europe, and Russia). However, technology is often re-invented: e.g. from ancient Greece, China, etc. Skill intensity and variations are higher with MNCs and foreign developed countries than developing countries. Developing countries are less able to invest in high capital requirements and in sectors where economies of scale are important. Countries like Indonesia have a very low number of patents. Countries like China have a very low enforcement of property and intellectual rights protection.

According to Amsden (1991) in all late industrializing countries (e.g. East Asian), the strategic focus of the firm tends to be on the shopfloor, because that is where borrowed technology is made to work. East Asia has managed the shopfloor exceptionally well. In these countries, the widely diversified business group is the predominant form of enterprise, sometimes large in scale (as in Japan and Korea), sometimes smaller in scale (as in Taiwan). Whereas industrialization in the 18th and 19th centuries was propelled by new products and processes, late industrialization is being driven by borrowing technology or learning.

It is also important to make some points regarding China in East Asia. Thus, this country's policy is "exports first" in order to increase capital (in the broad sense thus including technology) as fast as possible. However, the technological foundation (Song, 2012) is still fragile. Due to the international division of labor in Asia, China has many assembly factories: thus Japan and South Korea export to this country high technology parts; then China assembles these parts and exports the final products mainly to third countries like the USA. For example, in the consumer electronics industry, due to the open design rule and standardization of interface between components, products become modularized; hence production has become simple by purchasing key components and putting them together as the assembly becomes easy; hence the Chinese success in this industry (see Song, 2012). This modularization lowers the added value of vertical integration in advanced countries (Japan and Korea) and allows an easier and more economical international division of labor. On the other hand, from the hardware technology point of view, some of the

innovations are such that previous established technology becomes completely obsolete (see for example the Braun tube in relation to plasma in TV screens). Hence latecomers like China find it difficult to adjust to these technological discontinuities unless they introduce them with their own efforts.

Furthermore, in China the R&D as a percentage of GDP is still very low; but international comparison is not really possible since this country still has a huge percentage of population living in poverty. Overall it relies more on technology embodied in imports and international spillovers. Related to all this is the outsourcing issue. For example, Indians are developing their own technology; whereas the Chinese depend on Japanese, American and Korean providers of high technology main parts for assembly by China. Will China change this trend? Can China construct an endogenous and indigenous innovation system? It is difficult (Gu and Lundvall, 2006). Advanced countries might innovate faster than China or any other country (hence even the task to imitate and catch up becomes blurry). Finally note that there is no Chinese world class big business such as the Korean and Japanese ones which invoke famous brand names (see Lee et al, 2013 regarding the role of big business in economic growth).

Finally in this region of East and South East Asia we discern four groups of economies sorted by their ability to generate and absorb new ideas (Brahmbhatt and Hu, 2009):

(i) The newly industrialized countries (NIEs) which are at an advanced stage of transition from imitation to innovation. Especially Korea and Taiwan have emerged as centres of technological innovation and sources of knowledge diffusion for the rest of the economies in the region, based on conventional measures of innovation and patent citations. Thus, patents by China and Malaysia cite Korea and Taiwan more intensively than they cite Japan and the USA. This is due to the technology gap being too wide: the adopting economy may not have the absorptive capacity to learn and adopt the technology for its own use because the gap is wide (for example between China and Japan, or China and the USA)

(ii) China which heavily invests on both indigenous innovation and absorptive capacity

(iii) Thailand and Malaysia; they had successes with absorbing technology from developed countries, but have not shown clear signs of graduating from imitation to innovation

(iv) The low-income economies of East Asia which are at the beginning of the diffusion stage

From all the above salient points we can make the following suggestions. Already, the seeds of an autonomous technological development in East and South East Asia is under process and under the leadership of Japan and South Korea; China following closely; at a greater distance is Malaysia, and so on. Each country has its own internal capabilities and external influences (via foreign trade); the principle of contingency is paramount here. The road to technological and hence economic development is not easy; it takes time and many careful steps of economic policies. One of them is to encourage the autonomous development of national innovation systems based on an educational system that encourages critical mind and freedom of expression. Another one is to answer all the questions put forward in this brief study in the previous paragraphs. Much research is needed to provide adequate such answers.

References

- Amsden A. H. (1991), "Diffusion of development: the late-industrializing model and greater East Asia", *American Economic Review*, Vol. 81, no 2, pp. 282-286.
- Brahmbhatt M. and A. Hu (2009), "Ideas and Innovation in East Asia", *The World Bank Research Observer*.
- Gu, S. and Lundvall, B.-Å. (2006b), 'China's innovation system and the move toward harmonious growth and endogenous innovation', *Innovation: Management, Policy & Practice*, vol. 8, no. 1-2, pp. 1-26.
- Hill, H., (1997), "Indonesia's Industrial Transformation", Institute of Southeast Asian Studies, Singapore.
- Kim, H. (2012), "The great transformations in the Korean economy since 1962", in "Diversity and transformations of Asian Capitalisms" ed. by Boyer, R., Uemura, H., and Isogai A., Routledge.
- Lee, K., Kim, B. Y., Park, Y. Y., and Sanidas, E. (2013), "Big Businesses and Economic Growth: Identifying a Binding Constraint for Growth with Country Panel Analysis", *Journal of Comparative Economics*, 41(2), pp. 561-582.
- Song, L. (2012), "Development mode and capability building in the age of modularization and regional integration", in Boyer, Uemura, and Isogai (2012) "Diversity and transformations of Asian Capitalisms", Routledge.
- Sanidas, E. (2004), "A holistic model for the emergence and success of entrepreneurs with applications to Asian countries", *Journal of International business and Entrepreneurship*, 10(2), pp. 113-128.
- Sanidas, E. (2005), "Organizational innovations and economic growth", Edward Elgar Publishing.
- Sanidas, E. (2006), "The open system of four dynamic bio-socio-economic processes of the firm: the diamond of the black box", *The Journal of Socio-Economics*, 35(3), pp. 556-582.