

EXPERIENCES OF THAILAND IN TECHNOLOGY DEVELOPMENT IN SUPPORTING INDUSTRIES AND LESSONS FOR VIETNAM

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Abstract:

Supporting Industries (SIs), if developed, can minimize the import of raw materials, parts/components for assembling industries in the country, it is a prerequisite to make it become a part of global production chain. Technology development in SIs shall gradually improve the quality of products, enhance endogenous technology capacity towards being capable of improving, master technology and creating new technologies. This has an important significance in the present context of Vietnam where the technology level of SIs is still limited. Based on collected experiences of Thailand in technology development of SIs, this paper made some recommendations in respect of planning and policy implementation with a view to further developing technology, gradually improving technology endogenous capacity in SIs, thus contributing to the achievement of socio-economic development goals.

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1. Overview of the SI and technology development in SIs

The concept of SIs varies in different countries.

In the United States, it includes those industries providing manufacturing processes to form products before they are brought to final production industries; it includes areas such as industrial heaters, heat treatment, forging, welding, metallurgy, materials in grain forms, hi-class ceramic products and carbon based products [13].

In Japan, SI is understood as a group of industrial activities providing intermediate inputs (not including raw materials and finished products) for downstream industries; it includes areas such as casting, stamping, forging, welding, plating, mechanical processing, molding, heat treatment, production of metal, plastic, rubber, electrical, electronic components/parts [5].

In some European countries, SI is often understood as suppliers, subcontractors or leasing agents.

In Thailand, SI is understood as those industries providing parts, accessories, machinery, packaging services, testing services for basic industries (this means the industries in mechanical engineering, production of machinery, parts for vehicles, electrical and electronics are of important SIs) [3]; it covers specialized industries such as molding, die-casting, jigs manufacturing, punching, grinding tools manufacturing, surface treatment, etc.

SI has been perceived differently, in personal point of view, depending on each specific area. Specifically, SI is the production of industrial components, parts, products acting as intermediate inputs to be assembled into final products [4]. According to Tran Van Tho (2005), SI means all industrial products playing supporting role for the production of finished products. For instance, components, accessories, spare parts, packaging products, materials for painting, dyeing; they can also include intermediate products, semi-processed materials [7]. However, in terms of technology, SI is the industry producing inputs for manufacturing industry, whereby any manufacturing industry can possibly be associated with the SI. On the other hand, the production of machinery, equipment, vehicles, instruments, and tools for manufacturing industries shall not be subjects of SI; they are not considered as inputs but technological elements [8]. There is an argument considering that SI is entire process of creating parts/components involved in the formation of finished products for consumers; products of SI mainly include several areas such as metal, plastic, rubber, electrical and electronic. Enterprises of SI mostly are of small and medium scale, need high technology and management, strict contract conditions and relatively interdependent [6].

The term "supporting industry" has been studied in Vietnam since 2000. This term was only mentioned officially in Decision 34/2007/QD-BCN of the former Ministry of Industry (now the Ministry of Industry and Trade), regarding the approval of the "Planning on Development of SI to 2010, vision to 2020"; SI in this Decision included production sectors such as textile, footwear, electronics, informatics, automobile manufacture and assembly, mechanical engineering. After that, in Decision 12/2011/QD-TTg of the Prime Minister regarding "SIs development policy" whereby SI was defined as the industry to produce materials, components, spare parts, accessories, semi-finished products for other manufacturing and assembling industries to produce finished products, e.g, capital or consumer goods. Although there exist many different views of SI, they have some common points as follows: (i) the market of SIs is much narrower than that of consumer goods as the end users of supporting industry are assemblers who will finally create finished products; (ii) products of SI are mainly supplied by manufacturing companies, especially small and medium enterprises; (iii)

SI is defined on the basis of downstream industries (such as automotive assembling industry, motorcycles, textile, footwear, electronics informatics) rather than on specific characteristics of products of the auxiliary industry (such as mechanical engineering, rubber, plastics, electrical and electronics). In the framework of this paper, SI is defined as indicated in the Prime Minister's Decision No. 12/2011/QD-TTg whereby "*SI is the industry to produce materials, components, spare parts, accessories, semi-finished products for other manufacturing and assembling industries to produce finished products, e.g, capital or consumer goods*". Products of SI include materials and spare parts, components, accessories, semi-finished products made in Vietnam to be supplied to assemble, manufacture finished products. To develop SI, there should have some essential conditions [10] such as adequate industrial infrastructure, market, environment, institutions and resources.

Technology development is an activity using the results of basic, applied research through the implementation of experimentation and pilot production to improve existing technologies, create new technologies (Law on Science and Technology, 2013). The technology development through technology improvement, creation of new technology to successfully undertake technological innovation will generate added value for business. This is to show that technology has a direct impact on the efficiency of production of enterprises; if new, more advanced technologies than the existing ones are applied in a scientific way, it will create products with better quality, higher productivity, lower production cost. Through this innovation process, enterprises can link R&D activities with the production, this is an important step to help enterprises improve their technological level. Moreover, when science is developed, the life cycle of technology shall be shortened, thus promoting technological innovation; as Fredrick Betz [14] said it was the invention, development and introduction of new products, processes or services which have new technology embedded and accepted or rejected by the market. In recent years, products of SIs have many positive changes, however, the degree of market acceptance of products is not high, the majority of electronic manufacturers in the country is still a kind of assembler and sub-contractor of foreign companies; the competitiveness of textile enterprises is still limited, even there exist internal competition among domestic firms in bidding by lowering prices to win outsourcing contracts of foreign partners.

Currently, technology development in SIs plays an important role in the creation of products with high competitiveness, contributing to highly efficient exploitation of internal resources, it is the foundation to become a part of the international production chain. In addition, technological

development in SIs also creates conditions for enterprises to assimilate, adapt and gradually enhance endogenous technological capacity, contribute to promoted foreign direct investment, thus create active position for the economy, contribute to the nation's economic growth.

2. Experiences of Thailand

In addition to the development of car industry¹, Thailand has, in recent years, made significant progress in SIs, namely, electricals, electronics industry (supplied 40% of the world's hard drives in 2011), the share of industry (accounted for about 50% of GDP in 2011 compared to 44.9% in 2006) [16]. To obtain this achievement, Thailand government had effective measures in planning, policy enforcement in promoting the use of national resources, mobilization of external resources, especially policies to attract foreign direct investment, incentive policies to encourage technology import and create favorable conditions to promote businesses to make investment in R&D and technology innovation in SIs [11]. Thailand had also successfully established an effective communication channel between government, experts and the private sector in planning and policy enforcement, specifically:

- *With regard to policy making:* Thailand developed the S&T development plan (1997-2006), the automobile sector plan (2002-2006), the National Strategy for S&T (2004-2013) [15], thereby confirming the important role of S&T in the country's development with specific goals such as increased proportion of companies implementing innovation by 35%, socio-economic development towards achieving a balance between three areas (industry, community and society economy), in which electronic SI such as software and integrated circuits was one of the industries of high focus in the development of the industrial sector² with a view to produce high quality products (micro-electronics, electrical equipment, advanced integrated circuits, etc.), meeting domestic and export demand. To do this, the Government set up management agencies by cluster to support linkage activities and cooperation, thus gradually improve the technological innovation capacity and the application of advanced, appropriate technologies of enterprises (e.g, the micro-electronics and IC cluster will be managed by the Center for Microelectronics of Thailand, or the Institute of Electrical and Electronic Industry was responsible for testing local, imported components and protecting consumers, and also

¹ There are many automobile manufacturers, assemblers located in Thailand: BMW, Ford, Mitsubishi, Honda, Nissan, Mazda, Toyota, General Motors, Isuzu, etc.

² Selected industries: Food, automotive, software and chip, textile, tourism, medical and biotechnology.

involved in the development of policies and plans regarding Government industrial restructure). Furthermore, in the National Strategy of S&T of Thailand (2004-2013), there specified objectives for development of clusters capable of enhancing and supporting technology capacity of enterprises to increase the productivity and quality of potential industries (automotive, software, micro-circuits, textile, garment, health,...), develop highly-qualified human resources through acquisition, import of technological experts from abroad (*e.g, Chief Science Officer*);

- *Regarding decentralization of management*: Thailand government had set up a clear decentralized mechanism for management, monitoring among ministries/sectors, from central to local level with specific objectives and responsibilities for plan implementation in spirit of cooperation and coordination between state management agencies, business community and experts. Especially, the government paid due attention to the development of local capacity through specific activities such as development of high quality human resources, promotion of technological innovation in SIs, focus on building technological capacity for small and medium enterprises through education policies, financial incentives and public investment³. Moreover, Thailand had identified key industries of high domestic value (automobile industry, production of components/spare parts, electrical, electronics and information technologies) based on technology roadmap construction methodology, planning policy/master plan from top to down, associated with the active participation of private sector, experts. Therefore, contents of policy reflected major will of enterprises so the process of implementation of policies has many advantages;
- *In terms of financial incentive policies*: Thailand has issued many financial incentives for business engaged in R&D activities through the Innovation Development Fund, Foundation for Research and Technology Development. Accordingly, the Innovation Development Fund provides support for R&D activities in manufacturing sector in the form of 50-50, which means business must contribute at least 50% of the total budget, the rest 50% will be supported under soft loan with low interest rates (1/3 provided by commercial banks, 2/3 supported by the Fund). The Foundation for Research and Technology Development under the Ministry of Science, Technology and Environment supports the commercialization of the results of R&D, upgrading, modification of machinery and equipment to improve the quality of outputs in the form

³ Developing scenarios for commercial market development trend, and then determining priority technologies to create products to be imported or domestically produced.

of low-interest loans (about 5%/year), repayment period from 5 to 10 years; simultaneously the government also encouraged S&T development in business sector by allowing tax reduction or exemption for imported equipment for training, tax exemption and accelerated depreciation (40%) in the first year for R&D equipment. The government also developed an action plan to improve the national competitive capacity through improvement of R&D capability and human resources innovation at enterprises in order to facilitate technology development in the private sector [12];

- *As for international cooperation:* International integration and foreign investment attraction always receive high attention in Thailand. The government had established appropriate preferential policies in the direction of more simplified administrative procedures for enterprises, promoted technology innovation in enterprises to produce highly competitive products based on the market-determined principle, no discrimination between domestic and foreign enterprises, abolishing the previous localization requirements. Currently, Thailand Board of Investment under the administration of the government plays an important role and is mainly responsible for attracting foreign direct investment, local authorities are not allowed to issue particular policies concerning foreign direct investment - this is the difference between Vietnam⁴ and Thailand.

Besides the achievements obtained in SIs as mentioned above (cars, motorcycles, electrical, electronics), Thailand also faces certain limitations in technology development policy such as investment in R&D was still low (0.26% of GDP in 2003, about 1% of GDP in 2013), technological innovation capacity of enterprises in Thailand is still low and there is no close link between research, training institutions and industrial associations. Therefore, in order to enhance technological capacity, in general, and technological capacity in SIs, in particular, Thailand has yet to receive and import technology from abroad [9].

3. Lessons for Vietnam

In order to increase the localization rate of assembling industries in our country, reduce imports of accessories and components from abroad, gradually raise the contribution of industry to the economy, effective implementation of SIs development policies (*Decision 34/2007/QĐ-BCN dated 31st July 2007 on the approval of SIs development plan through 2010 and vision to 2020, Decision 12/2001/QĐ-TTg dated 24th February 2011 on*

⁴ In Vietnam, local authorities can approve FDI projects of small scale.

development policies for a number of SIs, Decision 1556/QD-TTg dated 17th October 2012 approving the scheme the supporting the development of SMEs in the field of SI), at the same time, to improve existing policies or issue new policies to promote technological development in SIs on the basis of selective experiences of Thailand, we need to:

First, improve the elaboration of strategy/planning/plan for SI development in association with raising the technology level of SIs, as it is still low in many sectors [2] (textiles, footwear, electrical, electronic, mechanical). Therefore, technology development is an important premise to create higher added value. For example [20]: in textile and garment, leather and footwear sectors with large export turnover, but about 80% to 85% of raw materials is imported from abroad (fabric, leather, zippers, sewing needle and thread, chemicals, dyes); or in automobile industry, the localization rate is only about 5% to 10% (mainly in car body, brake pedal, antenna for radio, seat frames, electrical wiring, plastic products). It is therefore necessary to make policies to develop SI in close association with raising the technology level of businesses, gradually contributing to improved product quality, lower cost, on-time delivery of products.

*Second, the State needs to have a clear decentralization of management and strengthen the coordination in the strategy/plan implementation for technology development in SIs to create favorable conditions for the monitoring process of the policy enforcement. Presently, SIs development policies are still general, unclear objectives, criteria, responsible agencies for implementation, resources to ensure the achievement of the objectives, thus it is difficult to implementation (e.g. *Decision 34/2007/QD-BCN, Decision 12/2011/QD-TTg*); there should be strong decentralization of state management in SI development, including technology development, from central to local levels. Moreover, there should be participation and dialogue of beneficiaries (business community) and stakeholders concerned (ministries, agencies, professional associations) and experts in the process of policy implementation.*

*Third, improve incentive policies (tax, credit, training, land use, direct support) to promote businesses in SI to conduct R&D activities and technological innovation. In addition to general preferential policies for businesses (*Decree 119/1999/ND-CP, Decree 56/2009/ND-CP, Resolution 22/2010/NQ-CP, Decision 677/QD-TTg, Decision 1231/QD-TTg, etc.*), the State should issue specific policies for enterprises operating in SIs to create favorable conditions for business to make investment, expand and upgrade their technological lines, gradually strengthen competitive capacity of their*

products in the market⁵, namely: increase the level of support, funding for research projects and pilot production of SIs products, preferential tax policies for import of technology lines to produce SIs products, preferential credit policies in the Fund for development support, Fund for S&T development.

Fourth, the State needs to strengthen the link among businesses to create a supply chain of SIs products. To do this, it is necessary to create a connection between local and foreign enterprises having demand on products (demand side) and those producing supporting products (supply side) by organizing fair, exhibition of products from SIs; through which gradually forming intermediary institutions, creating favorable conditions for the development of market for SIs.

In addition, the State should improve the quality of technological manpower in SIs through policies to support businesses in human resource development, establishment of R&D units in enterprises which can get access to advanced S&T of the world; thereby enabling businesses to master technology lines, gradually improve, replicate them towards technological innovation, thus contributing to the attainment of the business objectives in terms of product and technology. Furthermore, the State should accelerate administrative procedures reform towards more simplicity in receiving incentives of government for technological development, and enhance the attraction of foreign companies holding high and environmental friendly technologies to invest in SIs in Vietnam./.

REFERENCES

In Vietnamese:

1. Parliament (2013) *Law on Science and Technology*, Law No. 29/2013/QH13.
2. Ministry of Industry (2006) *Synthesis evaluation report on the technological level of industries*. Prepared by the Ministry's S&T department.
3. Vietnam Development Forum. (2005) *Prospects of Vietnam SIs as commented by Japanese businesses*.
4. Hoang Van Chau et al. (2010) *Supporting industrial development Policy in Vietnam up to 2020*. Report of State research thesis.
5. Ohno K. (2004) *SI, some points for analysis and consideration*. VDF and GRIPS.
6. Truong Thi Chi Binh. (2010) *Development of SI in household electronic industry in Vietnam*. PhD thesis.

⁹ The level of incentives, support, funding may be higher than under Decree 119/1999/ND-CP on a number of policies and financial mechanisms to encourage businesses to invest in scientific activities and technological

7. Tran Van Tho. (2005) *Economic Fluctuations in East Asia and the path of industrialization in Vietnam*. Hanoi: The National Political Publishing House.
8. Do Minh Thuy. (2012) *SIs in footwear sector - case study of footwear industry in Hai Phong*. PhD Thesis.
9. Phung Minh Lai, Phung Anh Tien (compiled). (2008) *S&T based Sustainable development and competitiveness of Thailand*. National Center for Science and Technology Information.
10. Nguyen Truong Son. (2013) *SI development in provinces of key Central economic region*. Conference Proceedings NCSTP.

In English:

11. WB. (2010) *Thailand Economic Monitor*. Washington D.C
12. OECD. (2011) *Review of Innovation in Southeast Asia*. Country Profile of Innovation Thailand.
13. Department of Energy. (2004) *SIs: Industry for future*. Fiscal year annual report. Washington DC.
14. Frederick Betz. (1998) *Strategic Technology Management*. Mc Graw-Hill.
15. *Thailand: The national Science and Technology Strategic Plan (2003-2013)*.
16. [http://www.dna.com.vn/vi/ Trademarks News / International News / industrial development:-looked Thailand](http://www.dna.com.vn/vi/Trademarks/News/International/News/industrial-development:-looked-Thailand)
17. www.chinhphu.vn: to see Decisions, Decrees and Circulars related to supporting industrial development.
18. http://www.cpv.org.vn/cpv/Modules/News/NewsDetail.aspx?co_id=0&cn_id=418062
19. http://www.aip.gov.vn/default.aspx?page=news&do=detail&category_id=216&news_id=1993
20. [http://socongthuong.namdinh.gov.vn/Home/CN thuongmai/2013/153/Phat-trien-cong-nghiep-phu-tro-Dau-la-huong-di.aspx](http://socongthuong.namdinh.gov.vn/Home/CN_thuongmai/2013/153/Phat-trien-cong-nghiep-phu-tro-Dau-la-huong-di.aspx) Home/ Industry Trade / 2013/153 / develop SIs where the direction .aspx
21. <http://kktvungang-hatinh.gov.vn/?x=224/xuc-tien-dau-tu/cong-nghiep-ho-tro-o-viet-nam-thuc-trang-va-giai-phap>
22. <http://kktvungang-hatinh.gov.vn/?x=437/xuc-tien-dau-tu/cong-nghiep-ho-tro-dang-tay-don-von>