

## Investigating the Supporting Industry in the Manufacturing Sector in Vietnam – Role, Development and Future Strategies

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### Abstract

The paper discusses the supporting industry (SI) in Vietnam from various viewpoints, describing its role and development in the process of international economic integration. First, we investigate the overall economic and industrial structures in Vietnam by applying mathematical models represented by the logistic curve. We present real situations pertaining to the development of SI for the electronics industry in the manufacturing sector in Vietnam as a vital example. Then we provide a generalization of SI's strengths, limitations and the issues hindering the further development of SI in the country. Finally, based upon the experience of East Asian nations and their policy strategies for developing SIs, we propose recommendations for designing future policies to promote SI in Vietnam.

**Keywords:** Manufacturing sector; Strategies; Economic; Development; Government

### Introduction

In the context of the drastic development of the scientific-technological revolution and the expansion of the globalization process, regional and national economies have had a tendency to merge and become parts and systems of the global value chain. Every country that seeks to develop must adhere to the system of the international division of labor. When the labor division and related production processes reach a high level, an industrial product is no longer produced in one space, place or a single company of a nation. Rather, the production process is divided into several stages of production carried out by affiliate companies located in local regions in different countries and often on different continents. Thus, the supporting industry (SI) was born indispensably stemming from the requirements of the new industrial manufacturing system for the key purpose of deeply specializing the steps of the production process. According to Thuy [1] SIs can be defined as a group of industrial activities which supply intermediate inputs (i.e., parts, components, and the tools to produce these parts and components) for assembly-type or processing industries.

### Literature Review

In general, as countries have become aware of SI's critical role in the socioeconomic development process, many of them, such as Japan, Thailand, China and Malaysia, have built a system of relevant development policies. The world's most developed industrialized country, the United States of America, defines SI as the industry supplying raw materials, components and implementing processes to support the production of these raw materials and components in order to assemble the final industrial products [2]. Japan International Cooperation Agency (JICA)'s [3] investigative report on the industrial development of the SI sector in 1995 (JICA [3]) assessed the important roles of SI, such as ensuring the initiative of the industry, developing the SME (small to medium-sized enterprise) system and reducing the deficit, and the actual SI situation in Japanese industries, and provided conclusions on the relationship and the linkage in production as well as the requirements and conditions to promote the development of Japanese SI serving industries in particular and the Japanese economy in general. In addition, Ichikawa [4] was the first to assess the status of SIs in Vietnam. Although SI played a very key role in terms of bolstering state-owned and private firms' competitiveness and increasing foreign

direct investment (FDI) inflow, the awareness of government agencies and businesses of SI was still very low and insufficient. Nonetheless, private business sectors and FDI enterprises were quite active in seizing opportunities to foster the development of SI, contributing to ensuring stable and sustainable economic growth as the development of SI would contribute effectively to exploiting the resources of Vietnam, reducing imports, limiting exports of natural resources and raw processing products, and improving the value-added of domestic industrial products. Furthermore, Hong [5] pointed out the increasing role of SI in the economic development process in developing countries. In order to promote the sustainable development of the economies, developing nations should create favorable conditions to attract FDI. However, in order to attract more FDI and to use FDI effectively, developing countries have only one way: promoting and building a strong foundation of SI to draw and utilize FDI effectively towards the sustainable development of their economies.

The white paper on industry and trade produced by MITI of Japan (now METI) [6] evaluated the role of companies producing parts in the process of modernization and industrialization and the development of SMEs in ASEAN countries, especially the ASEAN 4 (Indonesia, Malaysia, the Philippines, and Thailand). Indeed, promoting the development of the SME system enhanced the development of SI companies in the process of industrialization and modernization. In addition, some other authors mentioned solutions to the development of SI. Moreover, Goh [7] analyzed the close relationship between cooperation and division of labor among multinational corporations for promoting the economic development of Malaysia. That was the cooperative link in producing industrial products. The author emphasized the importance of policies for the development of human resources and connecting policies by the Government of Malaysia between Japanese consumer electronics groups and domestic firms in

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manufacturing components for the electronics industry in Malaysia. Noor et al. [8] discussed solutions to the development of SI for the electronics industry and emphasized the important role of governments in supporting innovation and promoting the creation of local businesses to provide support for the development of the electronics industry. Additionally, the authors posited that governments should build long-term and stable policies for the common benefit of the economies and the firms. They also emphasized that the policies should be harmonized between domestic and foreign enterprises. If not, local SMEs would have to struggle to develop under high pressure from multinational corporations even if they possess innovative business solutions as they cannot protect and help expand production and market scale without support from governments.

Asian Productivity Organization (APO) [9] summarized the experiences on the development of SI and analyzed policies for SI over time in Japan, South Korea and Taiwan. In particular, through investigating the policies to promote SI development in Japan, Korea and Taiwan, these countries point out the important roles of the policies by focusing on analyzing the role of the FDI attraction into the development of SI as well as regulating the localization rate and supporting effective policies from governments for linking businesses. All of these policies were seen as prerequisites for the development of supporting industries in Asia.

In Vietnam, in 2003, in the "Joint Initiative Vietnam - Japan" Phase I (2003-2005), the term SI first appeared. In 2007, the Ministry of Industry (now the Ministry of Industry and Trade - MIT) [10] decided to approve the master plan on SI to 2010, vision towards 2020 [10]. Accordingly, SI was defined: "a system of manufacturing facilities and technologies of input products such as materials, parts, accessories serving for the assembly of final industrial products". In 2011, in Decision 12/2011/QĐ-TTg of the Prime Minister, SI was specified as "industries producing materials, spare parts and accessories, semi-finished products to supply for industries in producing and assembling finished products" [11]. Vietnam, a developing country, has been in the process of speeding up its industrialization and modernization task in order to build a market economy. Hence, developing SI plays a vital role in the national strategy. Practices in some countries of the world have proven that the proper development of SIs is an important prerequisite to contribute to the development of industries as well as the national economy as a whole. SI is the direct incentive to create value-added and to increase the competitiveness of primary industrial products as well as to attract FDI [12]. It is also suggested that at the macro level, the development of SI helps reduce the imports of production inputs, thereby, helping to limit the strain on the deficit of the international balance of payments, especially the trade balance, as well as of foreign currency for imported goods. We will examine studies from other developed and developing countries to conduct international comparisons regarding the development of SI among nations. Furthermore, the strengths and weaknesses of SI will be acutely analyzed to gain an understanding of how to foster the SI in Vietnam. The main data sources are from General Statistics Office of Vietnam (GSO) [13], General Department of Customs (GDC), Ministry of Industry and Trade in Vietnam, JICA, Vietnam Development Forum (VDF) materials, ADB, and World Bank papers.

Until now, there have been a number of research studies on SI from different aspects. There have been several studies related to the role of SI for both developed and developing countries. These studies indicate the role of the SI in enhancing the competitive capabilities of enterprises and economies [4-14]. Meanwhile, currently in Vietnam, the law and policy system have not been strong enough to motivate the

development of the SI in terms of directions and the encouragement of investment. Thus, for the time being, SIs remain inexperienced and small-scale, and exhibit low competitiveness in Vietnam. The development of SI is a critical, large-scale and sophisticated issue relating to the entire manufacturing and service field. In order to promote comparative advantages, to meet the requirements of socio-economic development in particular and the process of the international integration in general, especially when Vietnam is engaging in the Trans-Pacific Partnership (TPP) agreement and the ASEAN Economic Community (AEC) in the coming time (ADB, [15]), the development of the supporting industry is necessary and pragmatic.

Anh [16] showed that among the development strategies of various industries, Vietnam should focus on the development of the electronics industry thanks to its many competitive advantages. Especially in the current period and the next, in the global value chain, Vietnam should focus on the production stage, which can take advantage of the cooperation and support of international electronics groups, while Vietnam should not participate in the stages of design and distribution in the value chain. In the process, for the production stage, Vietnam needs to invest more in producing supporting inputs for the development of the electronics industry.

In addition, Industrial Policy and Strategy Institute (IPSI) [2] introduced common issues on SI such as concepts, the factors affecting the development of SI, the need to develop SIs in Vietnam and the priority choice for the development of SI. On this basis, we examine the development of SI in Vietnam through a situational analysis of certain industries such as mechanical engineering, automotive assembly, the electronics industry, and garments and textiles. From the overall assessment of SI, the authors propose policies and solutions to the development of SI in Vietnam in the process of international economic integration, namely through preferential financial policies for SMEs, human resource development solutions, and investments in science and technology to enhance domestic production capability.

Meanwhile, Vietnam Development Forum (VDF) [14] published a book regarding a survey on the status of SIs providing an overall assessment of the status and problems of SI development in Vietnam. Especially in chapter IV, the author of this chapter, Mori (United Nations Industrial Development Organization (UNIDO), Vietnam) proposed the construction of a database of SI as a helpful way to develop SI by connecting foreign and local firms. He releases the causes needed to build a database on the development of SI because it will help shorten the process that FDI assemblers must go through to select suppliers. In addition, the database can also reduce the time needed for factory inspections and sample evaluations by allowing FDI assemblers to screen low potential suppliers and focus on only high potential suppliers. Moreover, the author pointed out the characteristics of the database that SI databases cover a relatively small number of firms in a specified business sector, but they contain detailed data of each company. This will enable FDI assemblers to narrow down targeted suppliers based on suitable technology and production facility. After all, we demonstrate that the construction of a database was urgently required and necessary in the development strategy of SI led by FDI companies and would benefit businesses in the country.

The objective of this paper is to investigate SI in the manufacturing sector in Vietnam with respect to its role, development and future strategy. In the next section we will explain the development of SI in the manufacturing sector in Vietnam, followed by that in East Asian countries. Section 3 discusses the lessons for Vietnam and future strategies for developing the supporting industry. Finally, we conclude with the summary and strategic policy recommendations.

## SI in the Manufacturing Sector in Vietnam

### Historical trend of industrial structure

Figure 1 shows the proportion of three types of industries given as I (Agriculture, Forestry and Fishery), II (Industry and Construction) and III (Services) in the GDP in Vietnam during the period from 1990 to 2015. With the continued high growth and stability of the GDP, the economic structure of the industries in Vietnam has had a significant change in the positive direction. From Figure 1, we find that type I industries have shown constant decreases from 38.1% in 1990 to 18.02% in 2015 in the 25-year period, while type II industries have shown a sharp increase from 22.7% in 2005, then a decrease to 38.25% in 2015. Additionally, and particularly, type III service industries show an increasing trend recently in the last 10 years from 38.33% to 43.73% in 2015, while it had been around 38% before 2005 except in the year 1995 with 44%. In general, economic restructuring has changed the structure of the country's labor moving to the right in the Figure, i.e., trend of industrialization and modernization. The number of employees in industry and services has been increasing, while the number of workers in agriculture has been declining.

Economic restructuring towards industrialization and modernization has been identified as the inevitable path for Vietnam in order to become a civilized and modern country. The contents and basic requirements of economic restructuring in the country towards industrialization and modernization are rapidly increasing the proportion of the value of the industries and construction, and trade-services in GDP while decreasing the relative share of agriculture, forestry and fisheries in the GDP. Figure 2 shows the growing trend of the GDP for Vietnam during the period from 2005 to 2015.

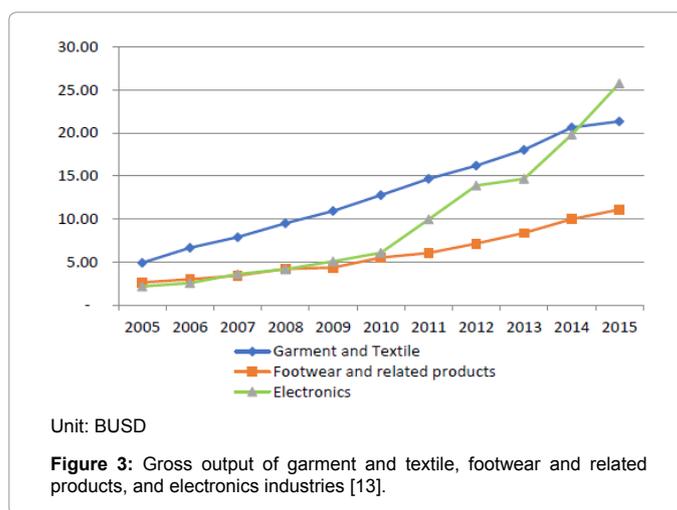
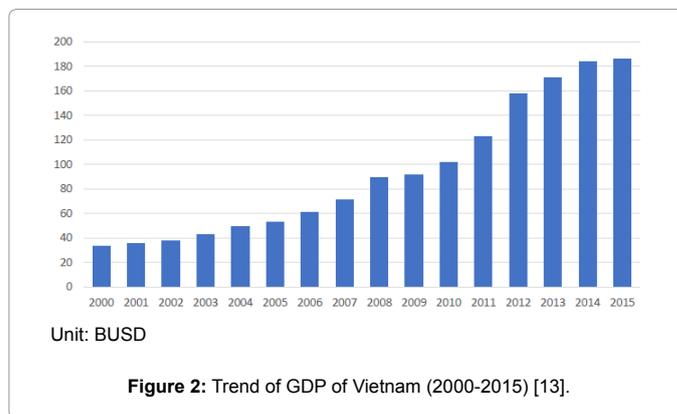
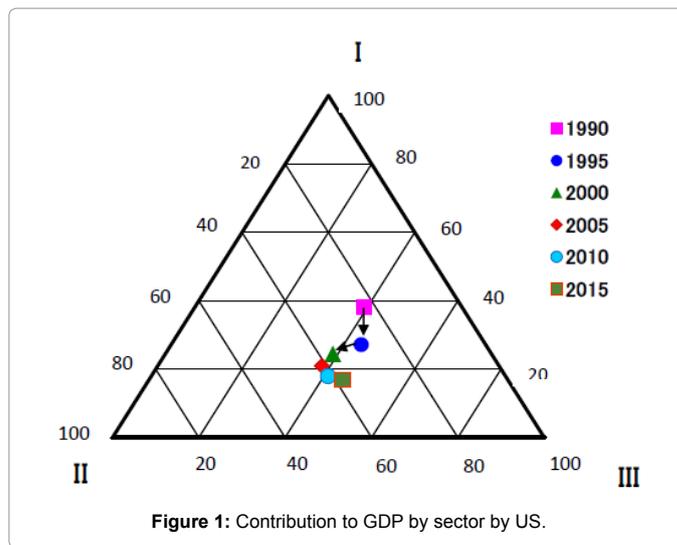
Figure 3 shows the gross output of garments and textiles, footwear and related products, and the electronics industries. Industries such as garments and textiles, and electronics had high growth of gross output. The gross output of the garment and textile industry in 2005 was 4.90 BUSD, then in 2015, it reached 21.34 BUSD. Meanwhile, footwear and related products had low growth in the period from 2005 to 2010, just increasing from 2.62 BUSD to 5.50 BUSD. The electronics industry also showed low growth in the period from 2005 to 2010, but sharply rose from 6.07 BUSD in 2010 to 25.76 BUSD in 2015.

Furthermore, thanks to the increasing trend of GDP (Figure 3) and the gross output of the electronics industry, its share to GDP also showed an upward trend from 2005 to 2015. Figure 4 shows the shares of garments and textiles, footwear and related products, and the electronics industries to GDP. Especially, the electronics industry's share reached a peak in 2015 achieving 13.85%. Meanwhile, the shares to GDP of the rest were quite stable during this period.

### Historical trend of the electronics industry

In 1990, Vietnam had only several dozen electronic businesses. Now, however, it has nearly 500 enterprises, of which approximately one third are foreign invested companies employing about 250 thousand workers. Currently, Vietnam is producing supporting products, mainly printed circuits, monitors, semiconductor chips, sensors, components, spare parts for telecommunications equipment, transmission equipment, optoelectronics, IC smart card, mixed-signal products, and so on. As shown in Figure 5, the total gross output of the electronics industry in Vietnam has increased steadily from 0.6 BUSD in 2000, up to 2.16 BUSD in 2005, 6.07 BUSD in 2010, and 25.76 BUSD in 2015.

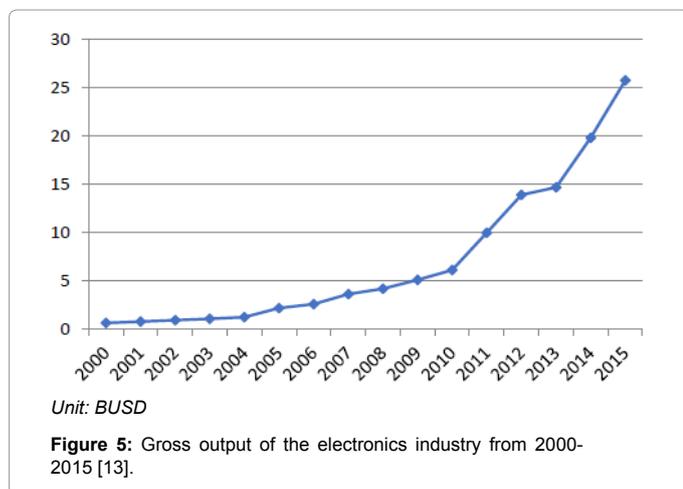
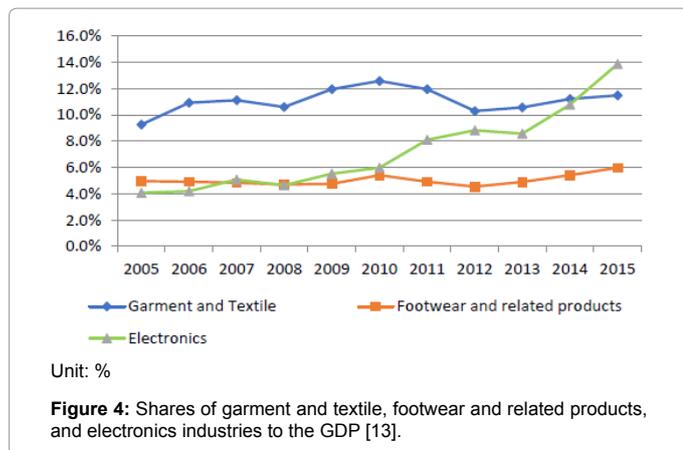
The historical trend of the electronics industry in Vietnam during



the period from 2000 to 2015, including that of the GDP and the share of electronics industry to the GDP, can be expressed by using the logistic curve. The approximation process for the output data for GDP, the electronics industry, and shares can be given as follows.

The formula for the logistic curve follows.

$$y = \frac{c}{1 + ae^{-bx}} + d,$$



y: {GDP, Electronics industry output, share}  
 x: Years indicated by 1, 2, ..., corresponding to each calendar year  
*a, b, c, d*: Parameters

Where *e* indicates the natural logarithm number. In order to estimate the parameters, we transform the above as follows where *ln* indicates the natural logarithm.

$$\ln\left(\frac{c}{y} - 1\right) = \ln(ae^{-bx}) = \ln a - bx$$

Thus, we obtain the following simple regression model with a single variable.

$$Y = A + BX \tag{2}$$

where variables *X* and *Y* indicate  $X=x$  and  $Y=\ln(c/y - 1)$ , respectively, and *A*, *B* are parameters.

$$Y = \ln\left(\frac{c}{y} - 1\right), X = x \tag{3}$$

Assuming the value of parameter *c*, values of parameters *a* and *b* are given by the following relation.

$$A = \ln a, B = -b \tag{4}$$

Defining the estimate values of parameters *c* and *d*, the regression results for model (1) are given in Table 1. Graphs containing both

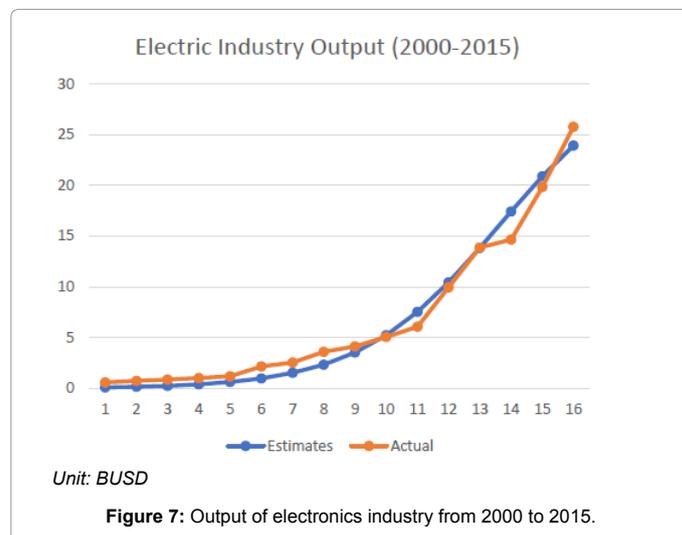
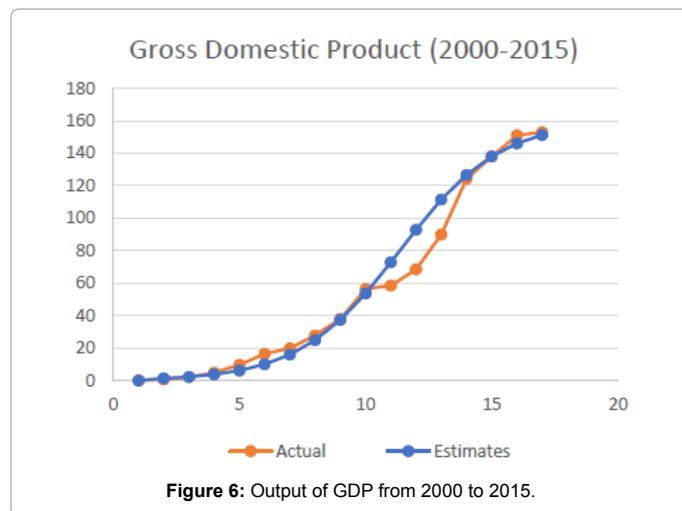
the actual and estimate values for the output of GDP, the electronics industry and the ratio of the electronics industry output to GDP are given in Figures 6-8, respectively. From these graphs, we find that the actual and estimate graphs are close with high goodness of fit.

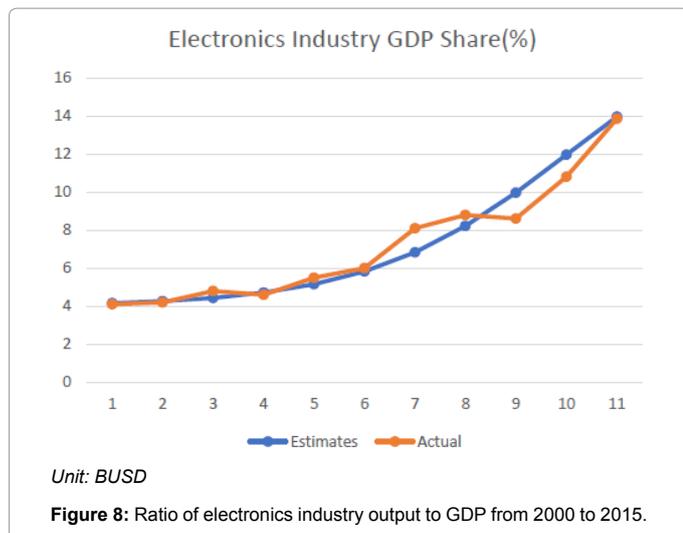
According to the General Statistics Office of Vietnam, SI in the electricity-electronics industry is the sector attracting the largest FDI funds among all the supporting industries in Vietnam with 445 FDI projects having a registered capital of up to 10 BUSD, mainly consisting of manufacturing projects for electronics parts (311 projects with an investment of over 8.2 BUSD). In addition, becoming the 150<sup>th</sup>

Parameter	GDP.O	E.O.	R.E.G.
A	5.232 (23.84) (0.0)	5.253 (15.45) (0.0)	5.107 (20.59) (0.0)
B	-0.5055 (-22.27) (0.0)	-0.4527 (-15.45) (0.0)	-0.5098 (-13.95) (0.0)
a	187.11	191.14	165.22
b	0.5505	0.4527	0.5098
c	160.00	32.00	16.00
d	33.00	0.00	4.0
R <sup>2</sup>	0.9862	0.9196	0.9648

GDP.O: Output of GDP; E.O.: Output of electronics industry; R.E.G.: Ratio of electronic industry output to GDP; ( ) : t-value (left), p-value (right)

Table 1: Regression results for the logistic model.





member of the World Trade Organization (WTO) in 2007 has opened up great opportunities for the electronics industry of Vietnam and the high-tech sector to have access to advanced technologies of the world and the region. Indeed, FDI funds for the electronics industry just for the period from 2007 to present reached about 3 BUSD, greater than the total FDI for the entire electronics industry for the previous 13 years (1993-2006). The main reason was the participation of large-scale foreign corporations such as Canon and Panasonic, especially in the mobile phone field with two large-scale projects of Samsung in Bac Ninh in 2010 and Thai Nguyen in 2013. As a result, the number of SI firms in the electronics industry also continued to increase, with 120 businesses in 2010, and 372 businesses in 2012. By 2014, it was up to 630 (Table 2). Furthermore, the gross output and the number of employees of enterprises manufacturing electronics parts have also increased dramatically (Table 3).

Meanwhile, the average business capital of electronics and computer manufacturing enterprises was 1.35 BUSD in 2005, 4.25 BUSD in 2010 and 5.89 BUSD in 2013 (Figure 9). The value of fixed assets and long-term financial investment was about 2.87 BUSD in 2013.

Thanks to the huge investments from foreign sources, mainly for export, the export values of the field of electronic components and computer components in Vietnam have increased sharply in recent years. The export value was over 10 BUSD in 2013 with an average annual growth rate of 21.8% per year in the period 2006-2013 (Table 4). The electronic component products have been exported to over 40 countries and territories around the world, and these export enterprises have been mainly due to the FDI.

The main exported electronic and electrical component products include electrical cables, optical fiber cables, parts and accessories for computers, office machines, mobile phone accessories, signal transceivers, electrical equipment, components and parts for broadcast receivers. These have been mostly semi-finished products assembled from imported basic components. Meanwhile, semiconductor components, and devices, supporting the power sector, have been also exported but with low prices. In order to serve the needs of use and assembly in the country, a variety of electronic components have been imported in large quantities. Most imports have been products for assembling electrical equipment, mobile phones, computers, office machines,

and the basic components (printed circuits, diodes, semiconductors, capacitors, and resistors). Nevertheless, aside from the achievements mentioned above, the localization rate of products in the industry was very low, only reaching about 20% in 2005, and consisting of mainly packaging and plastic parts. Meanwhile, the quality of the products in this sector was still weak and unstable. The electronics businesses in the country almost entirely exploited old products with low profits, thus achieving only a 5%-10% increase of value-added per year. Following the results of the survey of Electronics Business Association of Vietnam in 2006, FDI companies with established brand names imported 90% of their components, even reaching 100% imports for Fujitsu Vietnam. This was not only to the detriment of the industry in Vietnam as it has been difficult to reduce reliance on processing and assembling, but it also has reduced the competitiveness of manufacturing and assembling enterprises of electronics in the country. Currently, the field of manufacturing of electronic components has partly met the demand for components for the consumer electronics sector (30%-35% of the demand on components) and the automobile-motorcycle sector (about 40% - mainly for motorcycles production). Supply of this area for other downstream sectors is relatively low; for example, electronics and information technology and telecommunications is just 15%, while specialized electronics and high-tech industries is just 5% (Table 5).

Figure 10 shows the investment structure in the electronics industry in 2015. We see that the structure of investment in this industry is currently concentrated in consumer electronics with a dominant 66%, while the production of parts accounted for 22% and specialized electronics only 12%. This structure partly reflects the backward level of technology and the limitations of the electronics industry in Vietnam. Thus, over the years, the electronics industry has not yet made a breakthrough to bring Vietnam onto the world stage for electronics.

Year	2010	2011	2012	2013	2014
Number of SI enterprises (1)	2,643	4,161	4,992	<6,000	>6,000
Growth rate (%)		27.9	20.0	21.0	21.9
Number of SI enterprises in electronics (2)	120	219	372	510	630
Growth rate (%)		45	32	28.7	25.0
Ratio (1)/(2) (times)	22	19	17.2	16.4	16.0

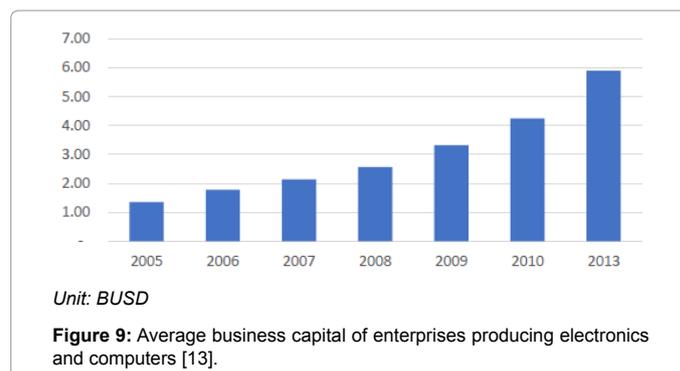
Source: GSO, 2015

**Table 2:** Number of SI enterprises in the electronics industry.

Year	2005	2011	2012	2013	2014
Gross output (BUSD)	0.2	0.35	0.38	1.43	1.63
Number of employees	15,288	61,266	80,724	87,989	101,188

Source: GSO, 2015

**Table 3:** Number of employees of enterprises manufacturing electronics.



Year	2005	2011	2012	2013	AGR
Export value (million USD)	1,427.4	4,669.6	7,837.8	10,601.3	21.80

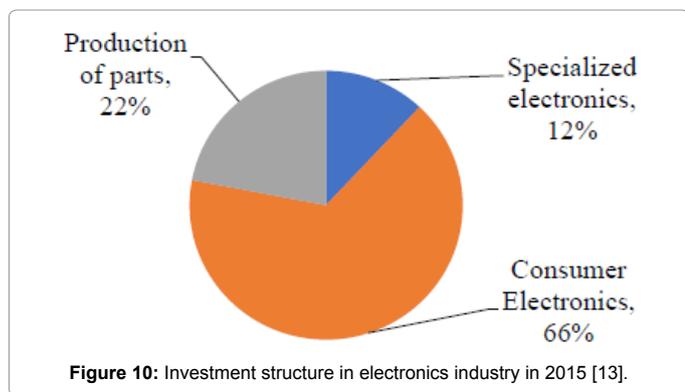
AGR: Average growth rate (%/year, 2006-2013) Source: GSO, 2014

**Table 4:** Exports of electronic components, computer parts and components.

Sector	Domestic supply (%)
Consumer electronics	30-35
Electronics, IT and Telecommunications	15
Specialized electronics	5
Automobile-Motorcycle	40
High-tech industries	5

Source: GSO, 2015

**Table 5:** The ratio of usage of domestic electrical and electronic components of assemblers in Vietnam.



**Figure 10:** Investment structure in electronics industry in 2015 [13].

### Assessing SI in Vietnam

In this section we describe the strengths, weaknesses, and the root causes of the weaknesses of SI in Vietnam in more detail from historical, economic, and industrial viewpoints.

**Strengths:** SI in Vietnam has been gradually growing and contributing to the development of industries. Besides, inflows of FDI have also increased while the reforms of state-owned enterprises have been carried out quickly. Even though the achievements are still limited, a base has been established, and this has paved the way for the long-term and sustainable development of SI in Vietnam. Currently, Vietnam has over 60,000 SMEs of different scales which are developing and forming the facilities of the production of raw materials, parts, and components to serve the demands of assembling industrial commodities inside and outside the country [13]. In particular, the high proportion of production facilities serves the needs of assembling products for local consumption. With incentives to attract FDI, many FDI firms have directly invested in supporting and manufacturing facilities in Vietnam. Meanwhile, Vietnamese companies now have strong innovation in technology, equipment, and huge investment in modern production lines. We know that the levels of the workforce, both engineers and workers, are improving. Moreover, costs, production efficiency, and the accuracy of delivery time are being focused on. A number of large SOEs have begun to abandon the production form of vertical integration in the past and move on to a form of depth investment, leading to the specialization of products towards increasing their competitiveness in the market, along with plans to become more profit-oriented [17]. For the time being, the production of metal components meets 85%-90% of the production demand of motorcycles. The manufacturing sector of electric-electronics meets 30%-35% of the demand for the household electric field and 40% for motorcycles production. As a result, the rates of localization of some industrial products are higher; for example,

70-90% for motorbikes, and 80-90% for electrical equipment. The electronic components have been exported to over 50 countries and territories around the world. The average growth in the period of 2006 - 2013 was 21.8% per year while the export value reached over 10 BUSD only in 2013 [13].

In summary, industry in Vietnam has developed and contributed greatly to socioeconomic development as well as attracted an ever increasing amount of FDI. It can be confirmed that the increase in the number of FDI projects is due to the continuous improvement of the investment environment. Especially, the government and firms have been aware of the importance of SI and paid more attention to the development of these industries. Therefore, SI initially has had encouraging development, thus, contributing actively to the stability and long-term effectiveness in developing industry in particular, and Vietnam's economy in general.

**Weaknesses:** Aside from this success, the process of development of SI in general and that in the above-mentioned industries in particular in Vietnam still has some limitations: Firstly, regarding the size of the businesses, the number of SI enterprises in Vietnam has been small with a medium level of ability, and in some cases even at low and backward levels compared to their rivals in many countries in the region and around the world. Besides, the growth of investment capital for SI businesses has still been low and not commensurate with the gross output of annual production yet. At present, SI firms are mainly SMEs. These companies operate mainly in the form of outsourcing and just produce simple and small products such as simple components with low value-added (SIC [18]).

Secondly, the technological level and localization rate of products are low. Although some enterprises have invested in purchasing machinery, equipment, advanced technology from overseas, mastering the operational parts and the maintenance of equipment is limited [18]. The utilization of the technological capability of enterprises, especially between the Vietnamese SI firms and FDI firms, is very weak, leading to low capture and technological absorbability. Indeed, internal resources are low while the gap in quality standards between domestic and foreign firms is very large. Moreover, the structure of products is imbalanced along with the backward technology and the large dependence on foreign suppliers' materials [19].

Thirdly, the competitiveness of SI products is weak. In particular, the technical and technological capacity and the institutional and managing capacity of SI firms are low, while the application of modern management standards is just formal style. SI enterprises experience difficulty for controlling quality. They experience high defect rates in production, leading to production costs that do not appeal to assemblers. Besides, due to the import of components, raw materials still have high costs, and this has affected the competitiveness of the products. Additionally, services included, brand, advertising, trading conditions, and the quality of the SI products of the industries are limited, thus, reducing the competitiveness in the market [19].

Finally, low qualified human resources are also an issue. The number of trained workers is currently low and they lack practical skills [20]. Moreover, low cost human resources no longer offer a competitive advantage in attracting FDI in Vietnam when some agreements on import tax exemption are officially [21]. Furthermore, the usability and creativity of human resources are limited. The quality of training is low, causing a large number of engineers, technicians and workers to be lacking in the accumulation of technological proficiency and practicality.

**Root causes of weaknesses:** The above weaknesses have many causes; however, they can be traced to several main ones as follows: Firstly, planning for mechanisms and policies in Vietnam is done only within the scope of the government, with little involvement of firms, donors, experts and scientists [22]. The intermediary institutions to support businesses in the development of SI are not sufficient, especially the financial supporting policies [23]. Furthermore, we focus more on reducing procedures to facilitate foreign investors without paying attention to the stage of post-inspection so as to assess whether foreign firms implement their business plans with the right commitment in terms of technology transfer, job creation, and other factors. In addition, incentives to attract investment in the industries have almost exclusively focused on large corporations over time, while SI firms tend to be small and medium size, and they receive less consideration from the government both at the central and local levels [24].

Secondly, the quantity of industrial equipment is limited with old and obsolete technology and low automation levels. Thus, the products of SI have poor quality, high cost, and are mainly consumed within SOEs, while the higher quality products are largely supplied by foreign companies [25].

Thirdly, the communication channels among FDI, assemblers, domestic companies, large corporations overseas, and, especially, Japanese corporations are lacking [24]. Vietnam has no national data base in this area. This causes manufacturers to face many difficulties in finding component suppliers and supporting services as well as seeking for the product market.

Finally, cooperation and linkages among SI businesses and manufacturing and assembling enterprises as well as among other SI producers are still very weak, particularly between the domestic sector and FDI companies [26]. Besides, the less dynamic responsiveness of Vietnamese providers has hindered the relationship building.

## Development of SIs in East Asian countries

The concept of SI began to appear in Japan and later in newly industrialized countries in Asia such as Taiwan, Korea, Thailand, where the products were usually processed in other production units different from the manufacturing and assembly of complete final products. However, each country has its own definition of SI. Specifically, in Japan, in 1985, the Ministry of International Trade and Industry [MITI] (later renamed METI - Ministry of Economy, Trade and Industry) used this term in the "White Paper on International Cooperation in 1985,": "the small-medium enterprises (SMEs) contributing to strengthening industrial infrastructures in Asian countries in the medium and long term and producing parts and components" [6]. Furthermore, in 1993, in the program of SI development in Asia, SI was defined by METI as an industry producing necessary items such as raw materials, spare parts and capital goods for assembling industry (including automotive, electric and electronics). Currently, SI in Japan is defined as "a group of industrial activities providing intermediate inputs (not raw materials and finished products) for the downstream industries" [14].

In Thailand, the definition of SI used by a number of agencies and organizations also varies. Thailand Ministry of Industry defines SI as the manufacturers of parts for the automotive and electric-electronics industries, such as metal machining, plastic injection molding, and testing. Likewise, Thai SI Development Office considers SI as the industry providing parts, machineries, equipment, and production supporting services such as packaging, product testing for basic industries [27]. Meanwhile, the Investment Committee of Thailand defines SI as enterprises now producing parts used in the assembly

stages of the automotive, machinery and electronics industries [1]. Thus, the definitions of SI by a number of agencies and organizations in Thailand commonly agree that SI consists of manufacturers of spare parts and processors in the fields of automotive, electric and electronics.

## Foundation of macroeconomic environment and policy regimes

The government plays a vital role, i.e. in the formation of policies, in the first stage of fostering SI in many developing countries. Whether it succeeds or not mainly depends on the strength of such policies on SI. Japan, since 1956, promulgated a law to promote the manufacturing industry, applying specific policies for SI, and a law on preventing delayed payment for subcontractors as well as a law on promoting small and medium-sized subcontractors in 1970. In addition, Japan set up industrial policies to promptly respond to changes in the business environment and to balance interests between SMEs and large enterprises [28]. Currently, Japan's policies aim to enhance business linkages between domestic and foreign enterprises and to effectively use cheap parts from overseas. Moreover, Japan's policies also focus on maintaining and fostering the advantages of technology and the exploitation and development of new products, improving product quality, changing designs and supporting businesses on the expansion of production, and on penetration into foreign markets. Hence, Japanese companies have been very successful in exporting products and organizing networks for selling products globally as well as efficiently exploiting international markets highly competitively.

Thailand, in the 1960s, implemented an import substitution industrialization strategy. By 1970, Thailand began a strategy of export-oriented industrialization. Thailand selected three priority areas comprising the technological industry, processing industry and rural SMEs. The government encouraged the development of metal processing and the manufacture of components and spare parts supporting the telecommunications and electronics exports. Thailand established many agencies to support the development of SI such as Institute for Automotive and Motorcycles, SI Development Office and SI Promotion Committee [29]. Even the business sectors in Thailand were engaged in drafting, adjusting and testing development policies. Thailand's policies were clear and stable with the application of both encouraging and compulsory measures to assemblers in localizing products by using parts produced domestically. Thus, the development of SI in Thailand was based on FDI with an open approach, flexible SI policies, and public administration, and thus despite the regularly occurring political instability and economic crises, Thailand still maintained its growth of SI in the long term [27].

## Development of SMEs

In the process of the development of SI, countries in East Asia strongly encouraged the entry of domestic SMEs, while the attraction of foreign investment was mainly utilized to guide local businesses. Japan, in 1963, enacted a law on investment promotion for companies serving SMEs. In 1996, a venture capital fund was established to support capital for businesses. Furthermore, in order to help SMEs accumulate capital, Japan improved the financial aid policies and preferential lending policies. The government directly funded investments in technology innovation to encourage SMEs to adopt new technologies as well as provided loans with low interest rates through banks for social policies (SMEA [28]). In cases where SMEs were disadvantaged in competition, the SMEs were protected by the government's direct long term loans with low interest rates. In addition, Japan established a variety of state-owned financial institutions to serve and provide funds

for the development of SMEs as well as to meet the capital needs of the businesses for investment in technological innovation. Furthermore, Japan set up the 5S standard system (sort, straighten, shine, standardize and sustain) for SI manufacturing enterprises, mainly SMEs, for the purpose of orientation and the provision of a framework for their activities.

Meanwhile, China focused on promotion, laying the foundation for the support and legal protection of investments for SMEs and investors' equities. China also set up regulations protecting the legitimate interests and rights of competition and fair trade rights for SMEs as well as loosening conditions for SMEs to gain access to world markets. The government provided its budget capital to support SMEs through the establishment of a fund to encourage SMEs to expand their scale. Additionally, the government also provided incentives by income tax exemptions for SMEs who met the regulations on the use of labor and the supply of materials, or for SMEs in poor and low developed areas [30]. The government supported SMEs in gaining access to markets by helping enhance technological innovations, promoting specialization, expanding networks for the supply of raw materials, and selling and exporting goods to foreign countries by export credit policies, credit insurances or by awarding SMEs who had suitable solutions on the reform of management. Especially for SMEs with excellent business performance, the government reduced or exempted the cost of capital guarantees.

### Linkages among enterprises

The realities in these countries showed that having close and smooth linkages among enterprises involved in SI, manufacturing and the assembling industry leads to strong SI development. Japan is the country with the most developed industry in Asia. In Japan, to serve the assembling companies, there are thousands of other satellite enterprises producing a variety of parts to support businesses. The Japanese companies that are of international stature account for only 1% of the enterprises, while 95% are lower level SMEs supplying parts to the former. Strong linkages among firms in Japan are divided into tiers in which tier 1 consists of large scale corporations running as general contractors. A large project will generally be split into many parts to further subdivide the work among smaller companies (tier 2 and tier 3), and even outsourcing for cost reduction. Indeed, Japan succeeded in linking businesses, which can be seen when all firms operate in the same direction towards management methods like 5S or Kaizen. This link has contributed to the development of SI in Japan [31].

In China, the rapid growth of SI in the most populous country in the world is due to close cooperation among local firms. Domestic assemblers had reliable supply sources of components and spare parts with good quality and low price from local companies, particularly SMEs. For example, China had 4,172 suppliers of automotive components (with SMEs accounting for 70%). In addition to the alignment of domestic suppliers with assemblers, China also strengthened its cooperation with foreign assembling companies. This created a high total export value; for instance, in 2007, China exported \$11.5 billion of automotive parts, increasing by 35% compared to the same period of the previous year. In 2008, the total export value of car and automotive parts was \$120 billion [30].

## Future Strategies for Developing SI in Vietnam

### Lessons for Vietnam

From the experiences summarized above, we can draw some lessons, focusing up on government policies and enterprises activities, respectively, for Vietnam to further develop SIs:

**Government policies:** In the development of industries in general and of SI in particular, the government plays a particularly important role. For policies and action programs on SI, from the experiences of Japan and Thailand, Vietnam should have clear, stable, and flexible policies as well as comprehensive, specific and equal action plans among different types of businesses. In addition, Vietnam needs to determine the focal agency that is in charge of SI in the administrative offices of the government. In the countries discussed in the previous section, in the first phase of the development of SI, the governments immediately established focal points, i.e. the supporting agencies, so as to plan, implement and manage the development of SI.

The government should develop policies suitable and consistent with reality. From the lessons of countries such as China and Thailand, the government of Vietnam needs to call for the participation of and proposals from businesses to narrow the gap between the government's perspectives and those of the enterprises. Vietnam also has held many workshops and panel discussions among policymakers and investors, but these have just stopped at conclusions while lacking any pragmatic actions. Thus, it is time for Vietnam to take drastic action and establish severe sanctions in cases where no action is taken after meetings or policies are wrongly implemented. Moreover, the government should give priority to SI sectors and products. Japan, Thailand, and Malaysia were successful when focusing on the development of specific supporting industries and identifying some basic components to specialize in. Vietnam should clearly identify such SI and SI products to focus social resources on as well as to shape orientations to attract businesses' investments.

Equally importantly, Japan and China also reduced taxes for assembling businesses possessing high rates of domestic purchases. With SMEs being disadvantaged in competition and operating in poor and low developed areas, the governments of Japan and China provided support by reducing taxes, giving exemptions from income tax, and offering direct loans with low interest rates in the long run. The Vietnamese government can also take the same action.

**Enterprise activities:** Similar to other countries in the region, companies with foreign investment funds specialized in producing components will make up the main SI production force in Vietnam. From the experiences of Japan, China and Thailand, Vietnamese enterprises should actively participate and contribute ideas with regards to building policies, strategies, and master plans on the development of industries in general and on SIs in particular. In addition, domestic enterprises should build linkages and work closely with each other to become satellite businesses providing parts and should closely associate with assemblers to set up value chains and thereby learn to transfer up-to-date technologies.

It is important to note that despite their successes, Japan, China, Thailand and Malaysia also experienced some failures and less successful policies in the process of the development of SI. For example, Thailand, when developing mechanisms and policies to cooperate with international organizations and to link domestic firms and multinational companies (MNCs) to promote the development of SI, was not successful due to a lack of coordination among their ministries as well as a lack of understanding by the businesses on the government's policies. Likewise, in Malaysia, when forming anchor companies, enterprises lacked enthusiasm because the anchor-supply mechanism of the Malaysian government treated sectors and business groups unfairly, followed by disparities in the development of different SIs. Thus, as a latecomer, Vietnam can learn from these experiences and conduct research and choose reasonable policies matching the

conditions and practices of the country in order to effectively develop domestic SI.

### Future strategies for developing SI

The development of SI requires long term efforts and huge investment. That is why it requires clear direction and consistency in government policies, especially policies for the development of industries and incentives for SI firms. MIT [32] as well as our recommendations on Vietnamese government SI policies, has listed the future strategies related to SI as follows:

- Policies for the development of industries: SI is a sector that requires large initial investment and high levels of machinery, technology and labor skills of workers, mainly managed by the SME system. In the case of late industrialization like Vietnam, the development of SI depends greatly on the development of downstream industries. Therefore, government policies for the development of industries in the mid and long term have a huge impact on the formation and development of SI in Vietnam.
- Policies for the development of SI: In the context of the new development of SI, exemptions from income tax and tax reductions for the procurement of equipment, for research and implementation or similar purposes have encouraging effects to the development of SI businesses. On the other hand, the stability of the government's policies, particularly its tax policy, is one of the important factors affecting investment decisions in SI.
- Promulgation of standards for products of firms: SI as an intermediate manufacturing sector supplying products for downstream industries is under pressure to meet the standards of the last manufacturers. The standards of quality, price, and delivery of assemblers have been often applied in accordance with global general standards. The promulgation of regulations consistent with international standards is thus vital in improving the response capacity of the enterprises through standardizing products, limiting the manufacturing of poor quality products, and strengthening the responsibilities of the manufacturers to the community. Therefore, in order to promote the healthy development of SI and to restrict the imports of low-quality equipment and components, the early construction of the standard system is necessary, especially in the implementation phase of international commitments nowadays.
- Supporting and encouraging activities: the reality in some industrialized countries like Japan and Korea have shown that SI rapidly developed when close and smooth interrelations between enterprises engaged in SI and assembling firms exist. Moreover, the experiences of these countries also specified the roles of governments in this regard. The government is required to act as the main intermediary connecting assemblers and SI firms, by activities such as providing a database of SI for interested businesses. Nevertheless, currently, Vietnam has no such database.

## Discussion

### Summary and policy recommendations

With the goal of basically becoming a modern industrialized country by 2020, the development of SI will play a vital role in the process of industrialization and modernization in Vietnam. Indeed, the rational

and efficient development of SI will partly support the development of the industry in particular and the national economy in general, especially in the perspective of deep and broad international integration. The real situation of SI in the industries in Vietnam mentioned in this paper recently have achieved significant results. However, SI in most industries still face common limitations and problems that need to be solved. Those include the master plan of the SI, capital, technology development in SI, human resource development, and restructuring some industries in Vietnam after the global financial crisis. These are the important elements ensuring scientific and real bases in order to propose feasible solutions promoting the development of SI in the coming time. On that basis, the paper generalizes solutions to the development of SI in the industries in Vietnam. The government and enterprises should not overlook any solutions to develop supporting industries, followed by contributions to building the market economy in the near future.

We believe that the government should call for ideas and contributions from enterprises and then complete the legal framework regulating the activities of participants in SI. In addition, the government should establish a united management organization at the macro level and a business association on SI to coordinate and link activities at the micro level such as between SI firms inside and outside the country and between SI companies and industrial enterprises. Then the government should adjust some existing financial policies related to the development of SI while giving priorities and focusing on each stage of development.

As developing clusters of industrial linkages increases yields and enhances the competitiveness of SI products, we believe that Vietnam must have policies for the development of clusters of industrial linkages (CIL) and enhance awareness of CIL, as well as for the development of master plans on ICs and IZs of each industry, each province associated with CIL and development-oriented policies. Thus, for CIL many businesses in Thailand and Malaysia as our model are adopting the model of Japan which is the integral manufacturing model, in which, parts, details of each machinery, equipment or product have separate standards and sizes. The production of these is often manufactured in a closed technology. In particular, this model is often closely linked with CIL to take advantages of geographical distance and the linkages with FDI firms. Thus, Vietnam should select the model of Japan for the development of SI associated with CIL in the close connections between FDI enterprises and domestic ones. This will be the right direction.

Designing and managing databases on SI is also important. Through studies on the building of SI databases of Japan and Thailand, the author proposes the basic content of the SI database as follows:

Firstly, there should be an overall and long-term plan to build a national database on SI. GSO (Ministry of Planning and Investment) should preside over the construction and upload it on GSO's website. Secondly, there should be better coordination among the Ministry of Planning and Investment, the General Department of Taxation, the General Administration of Customs and the People's Committees of provinces and cities in terms of propagative guidance to encourage SI business sectors in participating actively in data registration and to the updating of their activities so as to serve the construction of the national database on SI. Thirdly, GSO should invest appropriately to upgrade computer systems and networks to have consistency among provinces and cities. The system needs to conduct tests and undergo regular maintenance to better maintain the efficiency of the computer systems and networks equipped over the long term.

## Conclusion

We propose solutions on resources for the development of SI. The government should implement the following solutions:

- **Measures on science and technology:** Firstly, the government can provide financial support for technology innovation or for buying technology licenses from abroad, then promote technology transfer from large companies to SMEs, especially with regards to high-tech resources that FDI firms bring into Vietnam during their investment. Also, the government should establish technical centers on SI to help SMEs receive necessary advice to meet the quality requirements of the assemblers.
- **Manpower training:** Firstly, the government should develop programs connecting vocational training facilities with industries and build training centers in the industrial zones, high-tech zones and export processing zones, especially encouraging FDI enterprises' participation in the training. Also, we believe that Vietnam should cooperate with foreign partners to train specialized staff for the human resource development of the country's SI.

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