Development of The Electronics Industry of Thai Nguyen Province, Vietnam: Achievements and Limitations

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ABSTRACT

The electronics industry is a physical manufacturing industry playing a key role in the economy and has a strong impact on other industries. This study focuses on assessing the status and proposing solutions to develop the electronics industry in Thai Nguyen province. Research results show that at present, the electronics industry of Thai Nguyen province does not have a large number of enterprises but has the largest number of employees in the group of industries in the province; In addition, the net production and business revenue of this industry has a high growth rate. However, policies and support services for enterprises to invest and develop the electronics industry are still limited and lacked of strong linkage. Based on analyzing the current situation, the study proposes a number of recommendations to promote the development of the electronics industry in Thai Nguyen province: (1) Focusing on attracting investment, developing the production and supply network for the SEVT electronic complex; (2) Developing the human resource; (3) Focusing on infrastructure development; (4) Strengthening the environmental protection; (5) Promoting linkages in the electronics industry.

Keywords: Development, Electronics, Electrical Equipment, Industry, Thai Nguyen

I. INTRODUCTION

Thai Nguyen is the economic, political, and cultural center of the Northern Midlands and Mountainous region, and one of the first industrial centers of Vietnam. The government has included Thai Nguyen province into the Planning of Hanoi Capital Region to 2030 with a vision to 2050. Thai Nguyen has the opportunity to quickly and strongly develop in the direction of industrialization and modernization, aiming to become a modern industrial province in the coming time. In recent years, Thai Nguyen province’s leaders have focused on promoting administrative reform, business registration, investment approval, investment licensing, creating favorable conditions for the development of various types of enterprises and electronic industry production facilities to develop.

Currently, electronic industry enterprises have promoted efficiency in production and business and made great contributions to the development of the industry in particular and the economy of the province in general. In the coming period, the problem is that it is necessary to have appropriate directions and solutions to improve the efficiency of electronic industry enterprises, ensure sustainable development in the future, towards a common goal of socio-economic development in Thai Nguyen province.

There have been a number of researches related to the development of industry in general and the electronics industry in particular in Vietnam and other countries, such as: Timothy (2003) studied the trend of "outsourcing" in the world electronics industry in the period 1992-2002 and the trend of modularization in the value chain of the electronics industry. Tomofumi (2008) analyzed the investment strategies of some countries in industrial clusters producing computer hardware in Asia and the participation of Asian industrial clusters in the global electronic value chain. Huynh (2017) in the doctoral thesis "Dynamics for the development of Ho Chi Minh City's electronics industry in international integration" has shown that innovation and improvement activities were a driving force for the development of Ho Chi Minh City’s electronic industry in international integration, and at the same time, the development strategy and resources of the electronics industry played an important role in the decision to invest FDI in the electronics industry in Ho Chi Minh City. The study "The current situation of development of industrial enterprise in Thai
Nguyen province" by Long and Truong (2020) has clearly analyzed the development situation of industrial enterprises in Thai Nguyen province according to the criteria; propose a number of solutions for business development such as: solutions for materials resources, labor, capital, infrastructure, market and development policy. Although there have been many researches in many aspects about the industry in general and the electronics industry in particular, the research on the current situation of electronic industry development in Thai Nguyen province is a research gap that needs to be explored, analyzed and further studied. Stemming from this practical research requirement, the authors conducted this research on the status of electronic industry development in Thai Nguyen province to find out effective solutions to promote the development of this industry in the coming time.

II. METHODOLOGY

The study uses descriptive statistics, comparative, analysis, and synthesis data from reports, planning and statistics of agencies in Thai Nguyen province, Department of Industry and Trade, Management Board of industrial zones of Thai Nguyen province in the period 2011-2020 to evaluate the development of the electronics industry in Thai Nguyen province.

III. RESULTS AND DISCUSSION

A. Enterprises and Labors in the Electronics Industry in Thai Nguyen Province

In the period 2010-2013, the province's electronics industry only had 02-03 small enterprises in the non-state sector with 56 employees. Since mid-2014, after the Samsung Vietnam Complex in Thai Nguyen (SEVT) went into production, a large number of satellite businesses and the number of employees increased rapidly. Up to now, the whole province has 52 enterprises operating in the electronics and electrical equipment industry, increased 50 enterprises compared to 2010 and 39 enterprises compared to 2015.

| TABLE I: NUMBER OF ELECTRONIC INDUSTRY ENTERPRISES IN THAI NGUYEN PROVINCE, 2011-2020 |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|
| Indicators                      | Year 2010       | Year 2015       | Year 2020       | Increase in 2011-2020 (+/-) |
| Electronics industry            | 02              | 13              | 52              | 50               |
| Electronic                      | 01              | 09              | 43              | 42               |
| Electrical equipment            | 01              | 04              | 09              | 08               |

(Thai Nguyen Provincial Statistics Office, 2021).

Although the number of enterprises in the industry is not high (accounting for 5.7% of industrial enterprises), it has attracted and created jobs for over 93,200 people, contributing 45.4% of the number of employees in enterprises in the province, 59.5% of the industrial employees and become the industry with the largest number of employees in the main industrial groups of the province. The average labor size in enterprises is quite high, about 1,794 employees/enterprise, 10.5 times higher than the average of industrial enterprises and more than 33 times higher than the average of enterprises in the province.

Particularly in the electrical equipment industry, since the SEVT project went into production, it has also accelerated the attraction of investment in projects in the electrical equipment industry. Specifically, from 01 enterprise in 2010, with 33 employees, by 2020 it has attracted 08 projects to go into production, mainly concentrated in Yen Binh Industrial Park and Diem Thuy Industrial Park with the number of employees so far reaching over 2,070 people, equivalent to 230 employees/enterprise (equivalent to 134% of the industry average, reaching 171 employees/enterprise).

B. Net Revenue from Production and Business of Electronic Industry Enterprises

In the period 2011-2019, the net revenue of provincial enterprises and industries had a high growth rate, reaching 34.5%/year and 48.2%/year. A major contributor to these increases is the group of businesses in the electronics and electrical equipment industry. In the four years from 2016 to 2019, the net revenue of production and business of enterprises in the industry has maintained to account for 80% and 90% of the total net revenue of enterprises in the province and industry.

| TABLE II: NET REVENUE OF ELECTRONIC AND ELECTRICAL EQUIPMENT ENTERPRISES IN THAI NGUYEN PROVINCE |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Indicators                      | Year 2010       | Year 2015       | Year 2019       | Growth rate in 2011-2015 (%/year) | Growth rate in 2016-2019 (%/year) |
| Net revenue of electronics and   | 2.2             | 394,591         | 723,826         | 1,019.9         | 16.4            |
| electrical equipment industry   |                 |                 |                 |                 |                 |
| Contribution rate in Economy    | 0.004           | 77.7            | 79.5            | 51.7            | 15.7            |
| Industry (%)                    | 0.01            | 89.9            | 89.5            | 79.7            | 16.52           |
| Manufacturing industry (%)      | 0.011           | 91.8            | 91.3            | 83.5            | 16.55           |

Results compiled and calculated by the authors, 2022.
In the period 2011-2019, the net revenue of manufacturing enterprises also had a very high growth rate, reaching 50.0% per year, higher than the general growth rate of industrial enterprises and businesses in the province. If we separate and do not take into account the value of net revenue from electronic and electrical equipment enterprises, net revenue of manufacturing enterprises in the period 2011-2019 has a growth rate of 14.4%/year, higher than the growth rate of enterprises in the whole province (reaching 12.8%/year), but lower than the average growth rate of the industry (reaching 15.4%/year).

C. Production Value and Structure of the Electronics Industry

a) Production value of electronics and electrical equipment in the province’s industry

In the period of 2011-2013, the industrial production value of electronics and electrical equipment in Thai Nguyen is negligible, reaching from VND 5-10 billion, contributing only 0.02-0.04% in the industrial structure of the province (At constant prices 2010). Since 2014, the industrial value of the electronics and electrical equipment industry in Thai Nguyen province has grown dramatically with the great contribution from the electronic products (smartphones and tablets) of the SEVT Complex, therefore, the growth rate of the industry group in the period 2011-2015 reached 914.3%/year, bringing the industrial proportion to overtake and account for 91.1% of the industrial value of the province.

In the period of 05 years 2016-2020, beside the products of SEVT Factory, from 2018, the industrial value of the electronics and electrical equipment industry continues to be contributed from a number of other electronic products, such as: Integrated electronic circuits, television cameras, headphones... of enterprises operating in industrial zones in the province.

Therefore, the province's electronics and electrical equipment industry has had a relatively high growth rate in the 2016-2020 period, reaching about 15.9% per year, higher than the general growth rate of the industry (reaching 15.7%/year) and continue to increase the industrial proportion of the industry and maintain it to account for about 91-92% in the structure of industrial production value of Thai Nguyen.

| Indicators                                      | Year 2010 | Year 2015 | Year 2020 | Growth rate in 2011-2015 (%/year) | Growth rate in 2016-2020 (%/year) |
|------------------------------------------------|-----------|-----------|-----------|----------------------------------|----------------------------------|
| Production value of industrial industry in the whole province | 24,902    | 376,863   | 783,619   | 72.2                             | 15.77                            |
| Production value of electronic, electrical equipment industry | 3.2       | 343,545   | 718,613   | 914.3                            | 15.91                            |
| Proportion in the whole industry (Including SEVT) (%) | 0.01      | 91.16     | 91.7      |                                   |                                  |
| Proportion in the whole industry (Excluding SEVT) (%) | 0.01      | 10.6      | 22.9      |                                   |                                  |

Unit: Billion VND (comparative price in 2010) (Results compiled and calculated by the authors, 2022).

In the Northern Midlands and Mountainous region, the industrial value of the industry accounting for 80.6% of the industrial value of the electronics and electrical equipment industry in the region (secondly is Bac Giang province, accounting for 16.1%).

b) Production value of electronics and electrical equipment by economic sectors

Industrial production value and industrial proportion by economy sectors in the industrial structure of province's electronics and electrical equipment industry in the period 2011-2020 have the following characteristics:

- In the period 2011-2020, the State economic sector did not have any enterprises or establishments engaged in production activities in the industry and contributed to the development of the industry.

- The non-state economic sector in the three years 2011-2013 has low value and makes insignificant contributions to the industrial structure of the province. Since 2014, after the SEVT project went into operation, the number of businesses and employees increased, bringing the industrial value of the region to over 38 times compared to 2010 and the region's growth rate to 107.1%/year in the period 2011-2015.

| Indicators                                      | Year 2010 | Year 2014 | Year 2015 | Year 2020 | Growth rate in 2011-2015 (%/year) | Growth rate in 2016-2020 (%/year) |
|------------------------------------------------|-----------|-----------|-----------|-----------|----------------------------------|----------------------------------|
| Electronics and electrical equipment industry   | 3.2       | 150,389   | 343,545   | 718,613   | 914.3                            | 15.9                             |
| Structure (%)                                   | 100       | 100       | 100       | 100       |                                  |                                  |
| State (%)                                       | 0         | 0         | 0         | 0         |                                  |                                  |
| Non-State (%)                                   | 100       | 0.03      | 0.04      | 0.33      | 107.1                            | 81.2                             |
| FDI (%)                                         | 0         | 99.87     | 99.96     | 99.67     |                                  | 15.9                             |

Unit: Billion VND (comparative price in 2010) (Thai Nguyen Provincial Statistics Office, 2021).

In the period 2016-2020, the electronics and electrical equipment industry in the non-state sector continues to have a high growth rate, reaching about 81.2%/year, bringing the industrial value of the region to nearly 20 times higher than that of the value achieved in 2015.
Despite the high growth rate, reaching 93.7% per year in the 10 years 2011-2020, but due to the large value of the FDI sector, the industrial proportion of the non-state sector accounts for less than 1% in the industrial structure of the electronics and electrical equipment industry in Thai Nguyen province (Although the industrial proportion of the non-state sector tends to increase in the industrial structure).

- FDI economic sector: Since 2014, the industrial value of FDI sector in the electronics and electrical equipment industry of the province has made a high contribution to the overall growth of the whole Thai Nguyen industry. In the period 2014-2020, the proportion of the FDI sector in the structure of the electronics and electrical equipment industry has always remained above 99% and has had positive effects on attracting investment and developing the electricity industry as well as other industries of the province. The growth and industrial value of the FDI sector’s electronics has helped the manufacturing and the whole province’s industry reach over 40% per year in the period 2011-2020 and create jobs for 61.5% industrial employees and 46.6% employees in enterprises in the whole province.

D. Income of Labors in the Electronics Industry in Thai Nguyen Province

From statistics, the average monthly income of enterprise employees in the whole province has increased by about 181.1% in the past 10 years, lower than that of the manufacturing industry (reaching 189.1%/year). Particularly for the electronics and electrical equipment industry in the past 10 years, the industry’s labor income has had the highest growth rate of all industries (reaching about 389.5%). As a result, the income level of labors in the industry has increased rapidly and improved the gap compared with the average income level of enterprises in the whole province. Specifically, from 66% in 2010, equivalent to 100% in 2015 and higher in 2020, equal to 115% of the average level of provincial enterprises. It is estimated that by 2020, the average monthly income of enterprise labors in the industry will reach about 11.1 million VND/person/month, 4.9 times and 1.5 times higher than the level achieved in 2010 and 2015.

| Average monthly income of labor | Year 2010 | Year 2015 | Year 2020 | Growth rate in 10 years |
|--------------------------------|-----------|-----------|-----------|------------------------|
| In electronic and electrical equipment industry | 2,283 | 7,549 | 11,176 | 389.5% |
| Comparing to Province's industry | 66.2% | 97.5% | 115.2% | 181.1% |
| Manufacturing industry | 60.7% | 90.6% | 102.8% | 189.1% |
| Metal manufacturing industry | 44.2% | 83.4% | 75.1% | 188.1% |
| Garment industry | 111.1% | 180.0% | 153.7% | 253.7% |
| Motor vehicle manufacturing industry | 33.9% | 71.1% | 89.1% | 86.0% |
| Chemical, plastic, rubber industry | 158.8% | 137.8% | 128.5% | 504.9% |

Unit: 1,000 VND/labor/month (Thai Nguyen Provincial Statistics Office, 2021).

Within the second-level sector of the manufacturing industry, the monthly income of workers in the electronics and electrical equipment industry is currently in the third position, after the metal manufacturing industry (reaching about 14 million VND/person/month) and motor vehicle industry (about 12.5 million VND/person/month), however this gap has tended to improve over the past 10 years.

E. Products of Electronic Industrial, Electrical Equipment and Consumption Markets

According to data from Samsung Vietnam, currently about 50% of Samsung's mobile devices supplied to the global market are manufactured in Vietnam, including the latest and most advanced product lines. High-tech products "Made in Vietnam" produced from two factories SEVT (Thai Nguyen) and SEV (Bac Ninh) have been exported to 128 countries and territories around the world, of which the most consumed markets are Europe, North America, Southeast Asia, and the Middle East.

As for the SEVT complex in Yen Binh Industrial Park, some typical products from 2014 to now are:
- Smartphones: SamSung Galaxy, SamSung Galaxy Note series, SamSung Galaxy Tab series.
- Computer Samsung: PC, Laptop.
- Smart TV products: Smart TV, Full HD & HD TV, Crystal UHD, 4K TVs, 8K TVs, TV Accessories.
- Audio-visual equipment: Tower speakers, loudspeaker accessories, soundbars with woofers.
- Household appliances: Refrigerator, washing machine, air cleaning equipment, vacuum cleaner, kitchen tools.

In addition to the above products, from 2018 a number of other electronic products manufactured by enterprises in the province that are exported and consumed in the market include: electronic circuits, television cameras and headphones. In the three years of 2018-2020, the number of these products tends to increase over the years. It is estimated that in 2020, it reached about 232.5 million products, an increase of 38.3 times compared to 2018.
F. Limitations in The Electronics Industry in Thai Nguyen Province

- The number of enterprises in the electricity and electronics industry is still low. Thai Nguyen electronics industry has only developed in recent years (since 2014, after the Samsung project invested and operated), so the number of businesses is still low. In 2019, the electronics industry had 43 enterprises, decrease 04 enterprises compared to 2018, accounting for about 5.4% of enterprises in the manufacturing industry in Thai Nguyen province.

- The electronics industry mainly relies on FDI enterprises, which have not yet formed a domestic supply network. In 2019, FDI enterprises accounted for 99.7% of the industrial production value of the electronics industry in Thai Nguyen province. The network of domestic enterprises, supplying components and spare parts for the electronic industry has not developed yet. On the other hand, in addition to the field of mechanical engineering (most of which are manufacturers of motorcycle components, engines, and molds), Thai Nguyen also has a few enterprises in supporting industries, supplying components and materials of all kinds.

TABLE VI: THE NUMBER OF ENTERPRISES IN ELECTRICAL AND ELECTRONIC INDUSTRY IN THAI NGUYEN PROVINCE

| Content                  | Year 2010 | Year 2015 | Year 2016 | Year 2017 | Year 2018 | Year 2019 |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Manufacturing industry   | 349       | 399       | 422       | 576       | 669       | 794       |
| Manufacture of electronic products | 1 | 9 | 13 | 37 | 47 | 43 |
| Manufacture of electrical equipment | 1 | 4 | 9 | 9 | 11 | 12 |

(Thai Nguyen Provincial Statistics Office, 2021).

- Policies and services to support enterprises to invest and develop the electronics industry are still limited. Although there was an early orientation on developing the electronics and supporting industries, Thai Nguyen province currently does not have policies, programs and projects to support business development in this field. In which, the provinces and cities in the region have implemented business support activities such as Hanoi (annual supporting industry development program); Bac Ninh; Hai Duong (business support program, in collaboration with Samsung Vietnam).

- Services to support businesses and investors in the province are also limited. According to the results of the PCI assessment at the provincial level in 2020, Thai Nguyen's Business Support Services index score only reached 5.63, the lowest among the provincial component indexes, ranking 42/63 provinces and cities.

- Lack of strong linkage in electronic industry development: Thai Nguyen province still lacks of programs and schemes to coordinate, link with agencies, organizations and localities with strengths in the electronics industry and supporting industry, especially the provinces and cities in the Hanoi Capital Region.

IV. CONCLUSION AND RECOMMENDATION

With the rich potentials available, in the context of integration in the era of industrial revolution 4.0, along with policies to encourage local development, electronic industry enterprises have many opportunities to develop. With the rapid increase in the number and scale of investment capital, electronic industrial enterprises have created economic efficiency when contributing to increase the value of industrial production, increase revenue and profit, contributing to local budgets. However, the electronics industry of Thai Nguyen province largely relies on FDI capital and does not have a close connection in the development of the electronics industry. These problems require synchronous, timely and effective solutions to enhance business development, promote strengths and overcome existing limitations in order to improve operational efficiency of electronics industrial enterprises in the area. Specifically, some of the solutions proposed by the study are as follows:

1. Focus on attracting investment, developing production and supply network for SEVT complex with a number of solutions such as: Perfecting mechanisms and policies, improving investment procedures towards transparency and openness; Strengthening activities to support investors; Improve the business environment through upgrading the infrastructure inside and outside the industrial park; Research, develop priority policies, encourage the attraction of projects in the electricity and electronics industry.

2. Promote human resource development. Training and providing quality labor for businesses is a sustainable solution to attract investment and industrial development. Specifically: Encourage FDI enterprises, multinational corporations and private enterprises to participate in human resource training; Organize training courses on starting a business and improving knowledge and capacity for business managers...

3. Focus on infrastructure development: Create a clean land fund and the most favorable conditions for infrastructure investors; Accelerate investment in technical infrastructure in industrial zones and clusters and form industry clusters in the field of electronics; Implement measures to encourage and support enterprises to build and develop industrial zones and clusters specialized in electronics and supporting industries.

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(4) Enhancing environmental protection: Using, renovating and protecting the environment are inseparable from the goal of industrial development; Failing to approve or grant construction permits for investment projects and carry out construction without an environmental impact assessment; Propagating, educating and raising awareness about environmental protection; There are policies to prioritize, encourage and develop the social security system such as housing for workers, hospitals and schools.

(5) Promoting linkages in the electronics industry: Promoting the cooperation relationship between Thai Nguyen province and other provinces and cities in the Hanoi Capital Region in developing the electronics industry; Effectively combine the potential strengths and comparative advantages of each locality to accelerate the development of the Region; Strengthen the connection of domestic businesses and investors, especially supporting industry enterprises in the electronics industry.

CONFLICT OF INTEREST
Authors declare that they do not have any conflict of interest.

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