

**THAI NGUYEN UNIVERSITY  
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**RESEARCH ON INDUSTRIAL TERRITORIAL  
ORGANIZATION IN THAI NGUYEN PROVINCE**

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**The dissertation can be read at:**

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## LIST OF AUTHOR'S PUBLISHED WORKS

1. Nghiem Van Long, Nguyen Xuan Truong (2014), "Industrial territorial organization of Thai Nguyen in the period of integration and development", *The 8<sup>th</sup> National Conference on Geographical Science*.
2. Nghiem Van Long (2014), "The impact of industrial production on the natural environment of Thai Nguyen province", *The 4<sup>th</sup> National Conference on Young Cadres of Pedagogical Universities*, Hai Phong University.
3. Nghiem Van Long (2016), "Industry-the driving force for socio-economic development in Thai Nguyen province", *The 9<sup>th</sup> National Conference on Geographical Science*.
4. Nghiem Van Long (2016), "Relationship between the urbanization process and industrial development in Thai Nguyen province in the context of integration", *The 5<sup>th</sup> Viet Nam International Conference*.
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6. Nghiem Van Long (2018), "Assessing the reality of industrial development in Thai Nguyen province in the period 2005-2015", *The 10<sup>th</sup> National Conference on Geographical Science*.
7. Nghiem Van Long (2018), "The reality of industrial cluster development - an important factor promoting the industrial development in Thai Nguyen province", *The 10<sup>th</sup> National Conference on Geographical Science*.
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13. Nghiem Van Long, Nguyen Xuan Truong (2020), "The reality of industrial enterprise development in Thai Nguyen province", *Journal of Science and Technology of Thai Nguyen*, Volume 225, Issue 7, pp. 229-236.
14. Nghiem Van Long (2020), "Foreign direct investment (FDI) in industrial development in Thai Nguyen province for the period 2010-2018", *HNUE journal of science*, Social Science, Volume 65, Issue 5, pp.108-116.

# INTRODUCTION

## 1. The reason for choosing the topic

The industry always plays a leading role in the global economy, the territorial organization issue has a very important significance to the development. Vietnam is on the way to the destination of industrialization. In recent years, the industry has achieved many great achievements: rapid growth; structure has changed towards modernization; there have been many potential private industrial groups; industrial zones have developed; industrial clusters in the process of rural industrialization and modernization was paid attention.

Thai Nguyen is a province with many favorable conditions for industrial development. In recent years, industry has had a strong change, becoming a bright spot in attracting foreign investment. In addition to these achievements, Thai Nguyen's industry and industrial territorial organization still has certain limitations.

From the above reality, the author chose the topic "*Research on industrial territorial organization in Thai Nguyen province*" as a doctoral thesis in geography speciality.

## 2. Target, mission and research limit

### 2.1. Target

On the basis of an overview of theoretical and practical issues about industry and industrial territorial organization, the topic has target to analyze and evaluate the reality of industrial territorial organization in Thai Nguyen province, from which to propose solutions to organizing industrial territories in Thai Nguyen province until 2030.

### 2.2. Mission

Overview of theoretical and practical basic about industrial territorial organization. Evaluation of factors affecting industrial territorial organization. Analyzing and evaluating the reality of forms of industrial territorial organization in Thai Nguyen province. Proposing solutions to organizing industrial territories in Thai Nguyen province to 2030.

### 2.3. Research limit

The thesis focuses on issues related to industrial territorial organization throughout Thai Nguyen province, in-depth research on administrative units in relation to surrounding territories. Data sources are mainly used in the period 2010-2018, with a vision to 2030.

## 3. Research overview

In the world, there were many scientists of different schools researching on industrial territorial organization from the perspective of economics, development economics or geography. Geoscience was modernized in the second half of the twentieth century, the issue of economic territorial organization had many changes, becoming the object of study of many famous economists. In addition to economic theories, some forms of industrial territorial organization such as industrial zones and industrial clusters have been studied and applied in a number of regions and countries around the world.

In Vietnam, when industry is associated with the process of industrialization, the issue of industrial territorial organization becomes an

important content and activity of the specialized state agencies, which was set out in the master plans, development strategy. Besides, the issue of industrial territorial organization has also become the main content in many books, textbook for teaching, and research topics at all levels.

In Thai Nguyen, research on the reality of industrial development and forms of industrial territorial organization has doctoral theses in different speciality, mainly from an economic perspective. Up to now, there has not been any doctoral thesis in terms of geography, which research overall on industrial territorial organization of the province.

#### **4. Opinion and research methods**

##### **4.1. Opinion**

The thesis applies opinions research: systematic opinion, territorial synthesis opinion, historical-perspective opinion, economic opinion, sustainable development opinion.

##### **4.2. Method**

The thesis applies the typical research methods of geoscience: collecting and processing document method; method of analysis, comparison, synthesis; field method; survey method; professional method; mapping method and GIS geographic information system; prediction method.

#### **5. The main contributions of the thesis**

- Inheriting, supplementing and clarifying theoretical and practical basic about industrial territorial organization and their forms to apply research in Thai Nguyen province.

- Clarifying the strengths and limitations of factors affecting the industrial territorial organization in Thai Nguyen province.

- Analyzing the reality of industrial territorial organization and some typical industrial territorial organization forms in Thai Nguyen province: industrial enterprises, industrial clusters, industrial zones and industrial centers.

- Proposing a number of solutions for Thai Nguyen province's industrial territorial organization towards 2030.

#### **6. The structure of the thesis**

In addition to the introduction, conclusion, appendices and references document, the thesis has structure with 4 chapters.

### **CONTENT**

## **Chapter 1. THEORETICAL AND PRACTICAL BASIS OF INDUSTRIAL TERRITORIAL ORGANIZATION**

### **1.1. Theoretical basis**

#### **1.1.1. Concept of industrial territorial organization**

There are many different conceptions about industrial territorial organization, on the basis of overview of concepts, it can be understood that: industrial territorial organization is a system of spatial linkages of industries, forms territorial organization and combination of territorial

production on the basis of reasonable use of natural and socio-economic conditions to achieve high economic, social and environmental efficiency.

### ***1.1.2. Factors affecting the industrial territorial organization***

#### ***1.1.2.1. Geographical position***

Geographical position plays an important role in the organization of industrial territories, positioning industries, forms of industrial territorial organization, forming production relationships, exchanging products, expanding markets, creating a comparative advantage for many localities.

#### ***1.1.2.2. Natural conditions and natural resources***

Natural conditions and natural resources are an important basis for industrial territorial organizations, affecting directly and indirectly to the industrial structure by industry and territory. Minerals are the most important resource affecting industrial territorial organization through their reserves, quality and exploitation capacity. Water source participates in production lines, operating machines, deciding the formation and development of many industries. Land fund, land rental price, and land policy affect production capacity and attract investment in industry. Climate, creature have a certain influence on industrial territorial organization with the development of products that provide input materials for production activities.

#### ***1.1.2.3. Socio-economic factor***

The group of socio-economic factors has a decisive role for the industrial territorial organization. Labor source and labor quality affect the size, production efficiency, industrial structure by industry and industrial territorial organization. Infrastructure, technical facilities are indispensable factors in production, which has capacity to change the rules of distribution and the positioning of industrial enterprises. Science and technology in the 4.0 era are the direct production force of the industry, investment capital is an indispensable input to the industrial production process, these factors play an important role in the formation and restructuring, industrial growth. Institutions and policies affect the direction development of industrial and the forms of industrial territorial organization. The market is a very important output factor, creating motivation for the development of economic sectors, including industry. In addition, inter-regional and international cooperation, socio-economic, political reality in the country, the region and the world play a significant role, having direct and indirect effects on territorial organizations. industry.

### ***1.1.3. Forms of industrial territorial organization***

- Enterprise is an economic unit that conducts independent economic accounting, which has full legal status and it's established under the Law on Enterprises, the Law on Foreign Direct Investment. Enterprise is both a production organization and a territorial organization, participating in the value chain of industrial production.

- Industrial cluster is a place, which concentrate manufacturing industry, handicraft and perform services for manufacturing industry, handicraft industry, has defined geographical boundaries, no residents, it is invested in construction to attract and relocate small and medium enterprises, individuals, cooperatives, and local cooperative groups to invest in manufacturing business.

- Industrial zone is a place, which concentrate enterprises specializing in the production of industrial goods and providing services for producing industry, it has a defined boundary, no residents, and is decided to establish by the government.

- Industrial center is an industrial concentration area associated with medium and large cities. Each industrial center may include a number of industrial zones, industrial clusters with central enterprises attracting neighboring territories. These center were the basis for the formation of the industrial territorial organization.

#### ***1.1.4. Territorial organization evaluation targets applied to Thai Nguyen province***

##### ***1.1.4.1. Industrial development targets***

Proportion and rate of industrial growth in GRDP; scale and growth rate of production value; production value and production value structure by industry group, industry, economic sector; workers are working in the industry; labor productivity; Industrial exports in total import and export turnover.

##### ***1.1.4.2. Targets for analysis and evaluation of industrial territorial organization forms***

###### ***\* Enterprise***

Number of enterprise; number of employees of the enterprise; net revenue of the enterprise; total income of employees in enterprises; pre-tax benefits of the enterprise.

###### ***\* Industrial cluster, industrial zone***

Number of industrial clusters and industrial zones in operation; natural area and average area; occupancy rate; labor is working; investment; investment projects; production value; export value; to pay the budget of industrial clusters and industrial zones.

###### ***\* Industrial center***

Industrial production value; proportion of industrial production value of industrial center in total industrial production value of the whole province; the industrial structure of the industrial center; labor working in industrial centers, average labor productivity.

#### **1.2. Practical basis**

##### ***1.2.1. Industrial territorial organization in Vietnam***

###### ***1.2.1.1. Industrial development reality in the period 2010-2018***

In 2018, the GDP of the industry-construction reached 1,897.3 billion VND (accounting for 34.2% of the national GDP), the industry alone was 1,573.8 trillion VND (accounting for 28.4%). Growth rate reached 8.85%. Industrial production value reached 11,170.0 trillion VND. The industrial structure by industry has changed positively, increasing the proportion of industries with high technology content and high added value. The economic component's structure has also changed rapidly with the rapid increase in the FDI sector. In 2018, export turnover reached 213.0 billion USD, accounting for 87.4% of the country.

###### ***1.2.1.2. Some major forms of territorial organization in Vietnam***

- Industrial enterprises: In 2018, the whole country had 119,511 industrial enterprises in operation, of which 90,487 industrial enterprises operated effectively with 7,483.5 thousand employees. The total registered capital for production and business reached 8,491.7 trillion dong, revenue of 9,177.7 trillion dong.



- Industrial clusters: by the end of 2018, the whole country has established 736 industrial clusters with a total area of 22,317 hectares, with 621 industrial clusters put into production and business operations, accounting for 84.4% of the total number of industrial clusters. With a total area of 19,536 hectares, attracting 10,680 production investment projects, total registered capital of 137,568 billion dong, creating jobs for 537,172 laborers.

- Industrial zones: in 2018, the whole country had 326 industrial zones established with a total natural land area of 93,0 thousand hectares, of which 250 industrial zones were put into operation, the occupancy rate of industrial zones reached 58.0%. FDI capital invested in Industrial zones has grown very strongly, by the end of 2018, the industrial zone attracted 8,000 projects, with a total registered investment capital of 145 billion USD. Export turnover is 126.3 billion USD. Contribution to the budget 183 trillion VND.

- Industrial center: concentrated in plain and coastal areas. Some industrial centers have great significance in the country: Ho Chi Minh City, Hanoi, Hai Phong, Da Nang, Can Tho. Only 10 provinces and cities with the highest industrial production value in the country, accounting for 69.7% of the country.

### ***1.2.2. Industrial territorial organization in the Northern Midlands and Mountains region***

In 2018, the region's industrial production value reached 1,148.7 trillion dong (10.3% national industrial production value of the country). The main industries of the region are: mining, producing metal, construction materials, food and beverage, mechanics, electricity, chemistry.

Currently, the region accounts for 25.0% of the total number of operating industrial enterprises in the country, concentrated in the provinces with strong industrial advantages. The Northern Midlands and Mountains has 24 industrial zones planned with a total area of 6,141 hectares, total investment capital of 736.9 million USD, FDI capital 31.0 billion USD, domestic capital reaching 147.9. trillion dong. As of 2018, there are 84 industrial clusters having establishment decisions with an area of 3,033 hectares, occupancy rate reaching 51.0%, industrial clusters create jobs for 32 thousand workers. Northern Midland and Mountainous region has industrial centers of Thai Nguyen, Bac Giang, Viet Tri and Hoa Binh, which is also the area for developing industry in the region.

## **Chapter 2. FACTORS AFFECTING THE INDUSTRIAL TERRITORIAL ORGANIZATION OF THAI NGUYEN PROVINCE**

### **2.1. Geographical location**

Thai Nguyen is a province in the Northern Midlands and Mountains, the North contiguous Bac Kan, the East contiguous Lang Son and Bac Giang, the South contiguous the Ha Noi capital, the West capital Tuyen Quang and Vinh Phuc. Thai Nguyen is the southern gateway connecting the Northern Midlands and Mountains with Ha Noi, the Red River Delta and the northern key economic region. The geographical location is very convenient for developing industry.

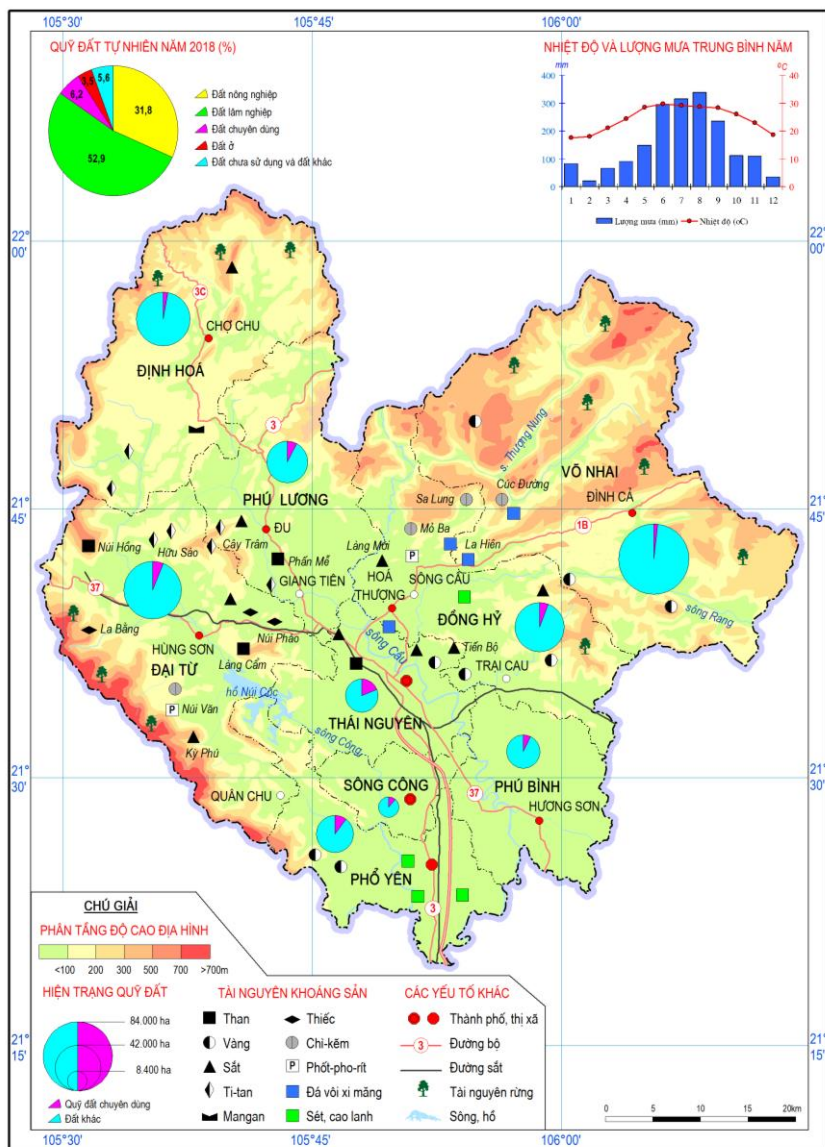


Nguồn: Niên giám thống kê tỉnh Thái Nguyên 2018

Người thành lập: NCS Nghiêm Văn Long, 2020

**Figure 2.1. Administrative map of Thai Nguyen province**

## 2.2. Natural conditions and natural resources



Nguồn: Niên giám thống kê tỉnh Thái Nguyên 2018

Người thành lập: NCS Nghiêm Văn Long, 2020

**Figure 2.2. Map of natural factors affecting industrial territorial organization in Thai Nguyen province**

### ***2.2.1. Mineral***

Thai Nguyen has abundant and diversified minerals in species, many of which have large reserves and significance for industry. This is a great advantage in the development and territorial organization of industries.

### ***2.2.2. Water source***

Water sources are abundant in both surface water and groundwater, meeting industrial production needs, especially in the production lines of industries that use a lot of water.

### ***2.2.3. Climate***

Facilitating for development of organisms, providing a diverse source of raw materials for processing industries, facilitating industrial production activities.

### ***2.2.4. Topography, geology and land***

In 2018, specialized land has an area of 21,760.0 hectares, of which the land for non-agricultural production is 5,157.0 hectares. Land for industrial production is still relatively large, land renting price is a competitive advantage of the province compared to many other localities, playing the role of attracting foreign investment.

### ***2.2.5. Forest resources***

To be the basis for the formation of local spots and industrial clusters of wood and forest products processing industries.

## **2.3. Socio-economic factors**

### ***2.3.1. Labor source***

Thai Nguyen has an abundant labor force with 774.1 thousand people in 2018, of which 765.7 thousand laborers are working in economic sectors. Labor in industry-construction accounts for 32.1%. The quality of labor is improved thanks to training activities, in 2018, the rate of trained workers is 29.9%. The labor force meets the demands of industry development.

### ***2.3.2. The infrastructure***

The infrastructure of province over the past time has been significantly improved, constantly upgraded and developed in a modern direction, meeting the requirements of socio-economic development, especially transport infrastructure, the ability to provide electricity and water.

### ***2.3.3. Investment***

The period 2010-2018 Thai Nguyen becomes a bright spot in attracting investment capital, especially FDI capital. In 2018, the total investment capital reached 55,188.3 billion dong, of which investment in industry-construction accounted for 60.2%. The FDI sector has grown rapidly. Only for the period 2010-2018, the total number of licensed projects was 131, accounting for 76.2% of the number of projects from 1993 up to now, with a total registered capital of 7,341.2 million USD.

#### ***2.3.4. Science and technology***

Science and technology play an important role in improving the quality and efficiency of production, increasing the competitiveness of products. Science and technology affect the industrial structure, choosing industrial territorial forms. Thai Nguyen has many positive changes in the application of new technologies in production, especially in industrial zones.

#### ***2.3.5. Policy***

Over the past years, Thai Nguyen has had many positive changes in development policies such as: stepping up the reform of administrative procedures, promoting foreign investment attraction, modernizing infrastructure and favour land rent price, creating favorable conditions for enterprises to do business...This is an important basis to promote the development of the province's industry.

#### ***2.3.6. Market***

Thai Nguyen has an expanding market for industrial products, including the internal, external and international markets. In the context of integration, the international market is more likely to expand associated with a number of strong products of the province such as: electronics, metals, textiles, processed agricultural products...

#### ***2.3.7. Cooperation relationship, regional and international linkage***

Thai Nguyen has a favorable geographical location, it has many conditions and possibilities to link in developing industry with surrounding territories such as Ha Noi capital, Red River Delta region, Northern key economic region, close to "two corridors - one economic belt" in the cooperation program between Vietnam and China. This is an important factor promoting the development of industry in the context of integration.

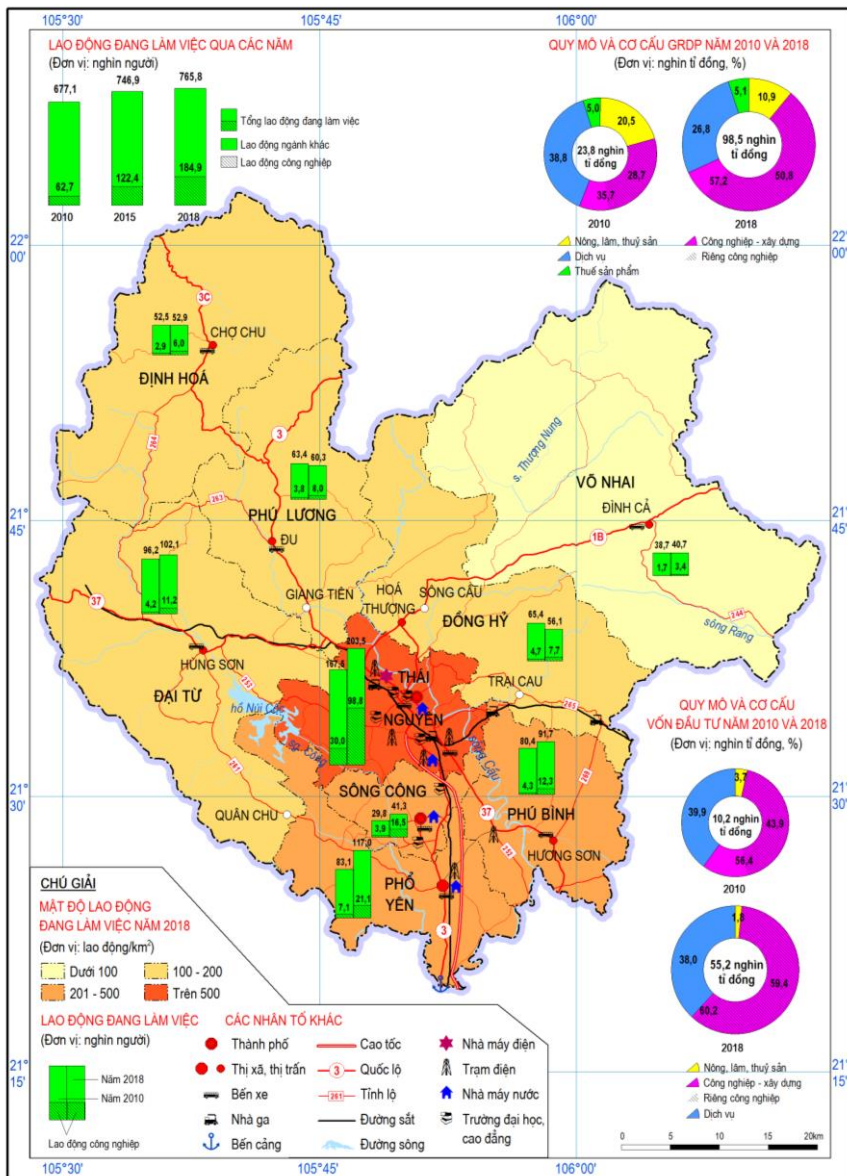
The integration trend has posed for Thai Nguyen's industry and industrial territorial organizations with opportunities and challenges. Opportunities for market expansion, attracting FDI investment, advanced technology, highly qualified labor, management experience. Challenges from competition, the risk depends on capital and production technology from foreign investment projects.

#### ***2.3.8. Economic development level and provincial competitiveness index PCI***

In recent years, the PCI of the province has been significantly improved compared to other localities in the country, the component indicators have tended to increase, creating confidence for businesses and investors in the province with many projects in the coming time.

#### ***2.3.9. Urban systems and economic centers***

Thai Nguyen has a relatively developed urban system. The process of rapid urbanization, associated with industrialization makes the development of the urban system which is an important premise to promote the development of industry with core center.



Nguồn: Niên giám thống kê tỉnh Thái Nguyên 2018

Người thành lập: NCS Nghiên Văn Long, 2020

**Figure 2.3. Map of socio-economic factors affecting industrial territorial organization in Thai Nguyen province**

## **2.4. General assessment**

### **2.4.1. Advantage**

Thai Nguyen has a favorable geographical position in exchanging economy, expanding markets and developing economic linkages with the surrounding territory. Mineral resources are abundant, diverse and valuable. Land for producing industry is still abundant, land rental price is competitive with other localities. Labor is abundant, labor quality has been improved day by day to meet development requirements. Infrastructure is being upgraded and completed in a modern direction to serve industrial production activities. The province has implemented many reforms in administrative procedures, many positive policies in developing industry, especially attracting foreign investment.

### **2.4.2. Hard**

Mineral resources are being exhausted due to high levels of exploitation. The source of high-quality labor is relatively small and unevenly distributed among the localities. The infrastructure network, technical infrastructure still has certain limitations and has not met development requirements. The development industry and industrial territorial organization are strongly competed in terms of capital, labor, markets, and development policies of many other regions with industrial development strengths.

## **Chapter 3. REALITY OF INDUSTRIAL TERRITORIAL ORGANIZATION OF THAI NGUYEN PROVINCE**

### **3.1. Overview**

#### **3.1.1. The role of industry in the province's economy**

GRDP of Thai Nguyen province is increasing rapidly, especially after 2014 with the presence and development of the Samsung Hi-Tech Complex. In 2018, GRDP reached 98,518.2 billion dong, ranked first in the Northern Midlands and Mountains region and 12<sup>th</sup> out of 63 provinces and cities of the country. Industry is the sector that plays the most important role in the province's economy, accounting for 57.2% of the GRDP in 2018.

#### **3.1.2. Scale and growth rate of industrial production value**

Industrial production value is increasing rapidly, reach 742.2 trillion dong in 2018, accounting for 64.6% of the industrial production value of 14 provinces in the Northern Midlands and Mountains region, ranking 5<sup>th</sup> /63 provinces and cities. In the period 2010-2013, the average growth rate

of production value is 11.0%, and in 2014, the growth rate suddenly increased by 82.0%. After 2014, the growth rate was stable at a high level, reach 13.4% in 2018.

### ***3.1.3. Industrial production value structure by industry group and secondary industry***

Industrial production value has a very clear differentiation between groups of industries. The processing industry group dominates absolutely with 734.4 trillion dong in 2018, accounting for 98.9% of the industrial production value of the whole industry and tends to increase the proportion. The mining industry group tends to decrease its proportion, only 0.5% in 2018. The production and distribution of electricity, gas, water, and waste treatment industries has a negligible proportion, accounting for 0.6%.

The structure of industrial production value by industry (level 2) also has a clear differentiation and has many rapid changes with the appearance of foreign investment projects in the electronics-informatics industry. Since 2014, the electronics-informatics industry with electrical equipment, electronics, phones, and tablets has the largest proportion, accounting for 90.4% of the industrial production value in 2018. The province's strong industrial products are: phones, tablets, rolled steel, motor vehicle spare parts, medical equipment and tools, electricity, garment products, cement, construction bricks.

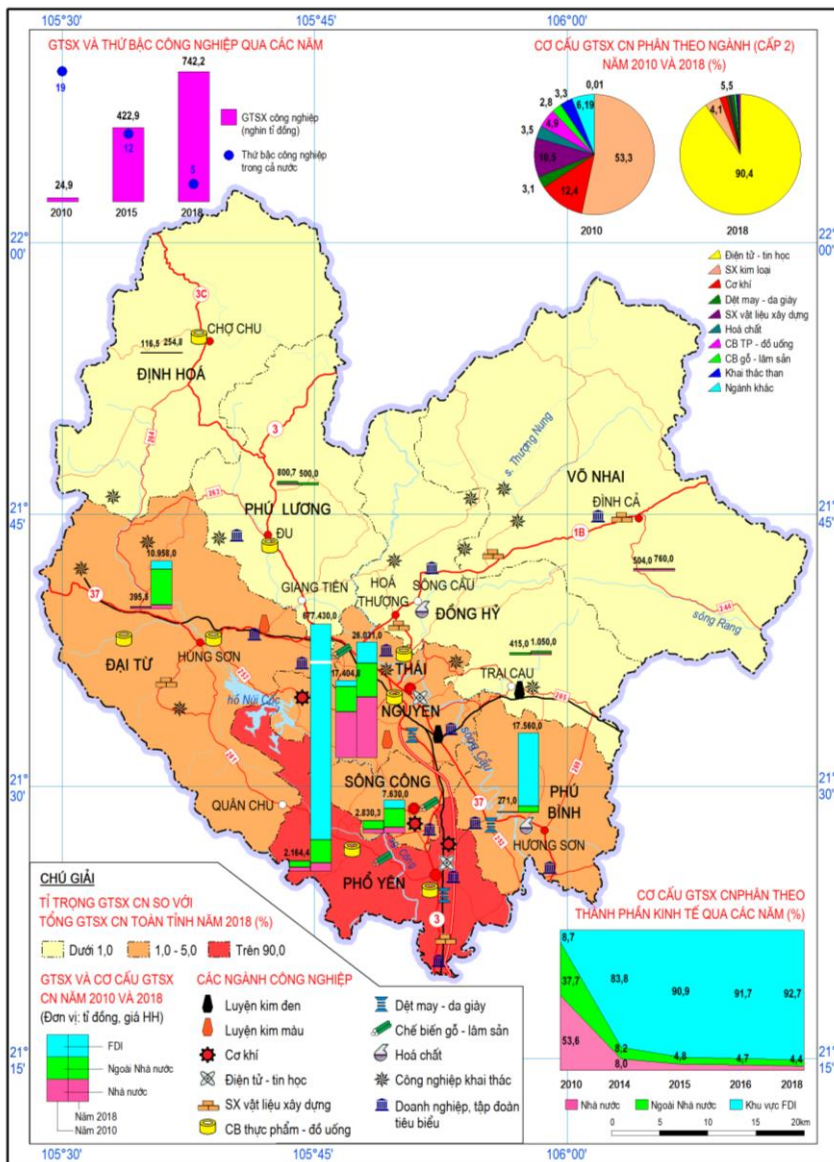
### ***3.1.4. Industrial production value structure by economic sectors***

The structure of industrial production value by economic sectors has changed rapidly. The State economic sector, before 2013, played a key role, now tends to reduce its proportion to 2.9% in 2018. The Non-State economic sector also tends to reduce its proportion, accounting for 4.4% in 2018. The foreign invested sector rapidly increased and accounted for 92.7% in 2018.

### ***3.1.5. Export turnover of industrial goods***

Industrial products always account for the majority of the province's export structure. In 2018, the export turnover of industrial goods reached 24,832.2 million USD, accounting for 99.9% of the total export turnover of the province, of which phones and phone components accounted for 96.8%. Other industrial goods groups have a small proportion of export value.





**Figure 3.1. Reality map of industrial development in Thai Nguyen province**

## **3.2. Industrial territory organization of Thai Nguyen province**

### **3.2.1. Industrial development according to territorial space**

Industrial production activities has differentiation according to territory, focusing on development in localities with many favorable conditions for development such as Thai Nguyen city, Song Cong city, Pho Yen Town, those locality accounts for 95.8% of the industrial production value of the whole province in 2018. Before 2014, Thai Nguyen city was the locality with the leading industry in the province. Pho Yen with a Samsung project related to the electronics- informatics industry. Some other localities in recent years also have a rapid growth in production value such as: Phu Binh, Dai Tu.

### **3.2.2. Industrial enterprises**

- Industrial enterprises are increasing rapidly, in 2018 there are 768 enterprises, accounting for 22.3% of enterprises in the whole province, of which enterprises of processing and manufacturing accounts 87.1% of industrial enterprises and tend to increase the proportion.

- The labor force in industrial enterprises also tends to increase, in 2018 there are 162,068 laborer, average each enterprise has 211 laborer. Labor concentrated mainly in processing and manufacturing enterprises. Labor in industrial enterprises has relatively high income, in 2018 the total income of industrial enterprises is 17,708.2 billion dong, accounting for 82.0% of the enterprise's income, the average income is nearly 8,2 million dong/person/month.

- Industrial enterprises are the sector with the largest investment capital for production and business among economic sectors with 323.2 trillion dong, accounting for 89.2% of the business capital of enterprises, mainly in the field of processing and manufacturing.

- The production efficiency of enterprises is getting bigger and bigger, reflected in revenue and profit. In 2018, the turnover of industrial enterprises reached 688,034.5 billion dong, the average revenue of each enterprise reached 895.9 billion dong; profits reached 65,446.2 billion dong, accounting for 99.2% of profits of enterprises in the province.

- In addition to the achieved results, the development of industrial enterprises also revealed many limitations: the management of enterprises still had many inadequates, enterprises were mainly small and medium sized, investment capital has a disparity between economic sectors, the competitiveness of enterprises is limited, there are not many investment projects in enterprises, the level of automation in production is medium and low.

### **3.2.3. Industrial clusters**

- The number of planned industrial clusters has changed over time to accord with the province's development conditions. In 2018, the province has 35 industrial clusters with a total area of 1,259.0 hectares, of which 25

industrial clusters are operating with a total area of 727.0 hectares; 505.2 hectares of industrial land can be rentable - accounting for 40.1% of the total planned area of the industrial cluster. The average area of an industrial cluster is nearly 36.0 hectares/industrial cluster. The occupancy rate of industrial clusters reaches 47.1%, only 1/3 of the number of industrial clusters has occupancy rate is over 70%, the rest is mainly below 50%.

- The number of projects and investment capital for production in industrial clusters increased rapidly after 2015. Accumulated to 2018, there are 72 investment projects, of which 45 projects have been put into operation, 27 projects are building ground, total registered capital 5,836.6 billion dong, implemented capital 4,260.7 billion dong, average scale of one project is 81.1 billion dong.

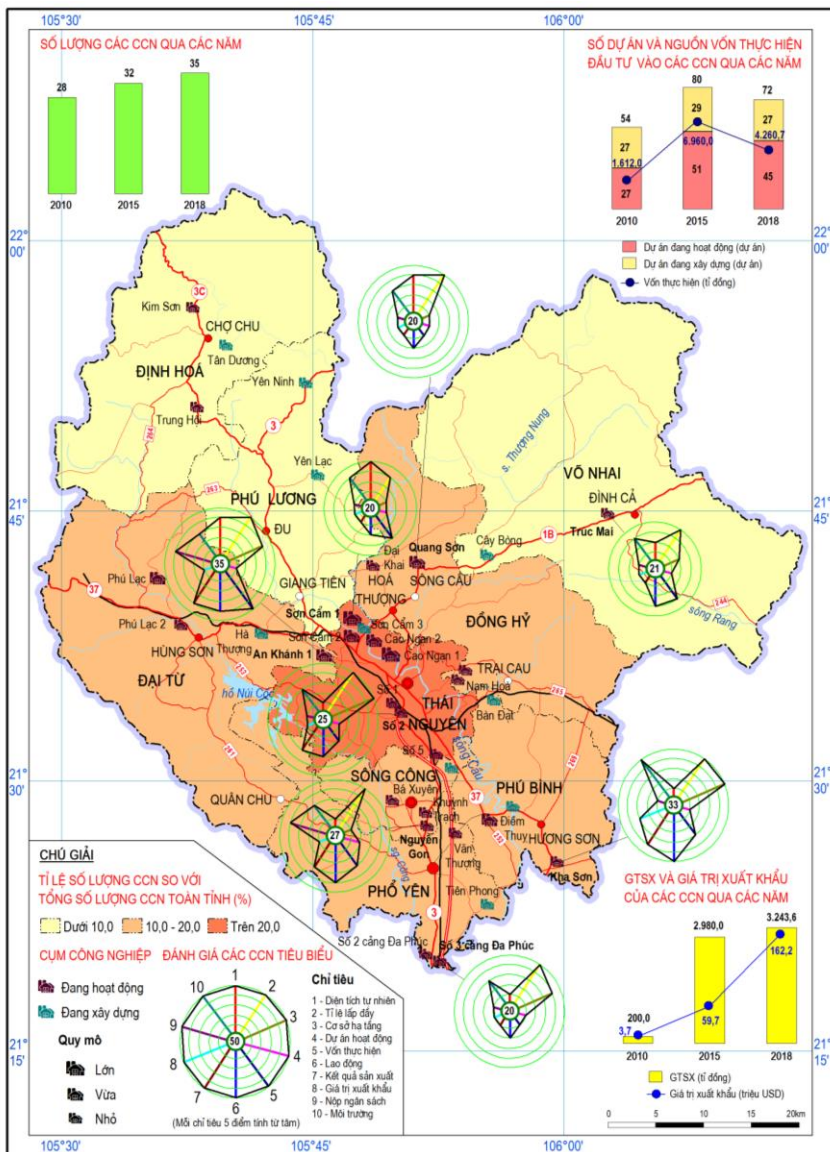
- The total number of employees in the industrial clusters is 7,650, accounting for 33.4% of the workforce in industrial production establishments of the province. Labor concentrated mainly in the districts of Phu Binh, Dai Tu, Pho Yen town.

- In 2018, the industrial production value of the industrial clusters reached 3,243.6 billion VND, paid to the state budget 72.3 billion VND. The export value of goods from industrial clusters reached 162.2 million USD with products related to key industries of the province such as metallurgy industry, mechanics, production of construction materials, production of goods. consumption, supporting industry.

- The problem of environmental protection in industrial clusters still has many problems: until now, there are no industrial clusters investing in building concentrated wastewater treatment systems, there are still unreal industrial establishments present correct and full environmental protection measures as committed.

#### ***\* Evaluating achievements and limitations of industrial clusters***

The development of industrial clusters contributes to change structure and economic growth in the direction of industrialization and modernization, contributing to the industrial production value and paying the provincial budget, creating jobs for labor, using effectively of infrastructure, promote industrialization and modernization of agriculture and rural areas, developing sustainably handicraft production. However, the average occupancy rate is low, industrial clusters in rural and mountainous areas are operating singly, and the infrastructure is not synchronous; many projects have not been implemented or are behind schedule; capital investment in industrial clusters is limited; lack of labor with high professional and technical qualifications; level of automation in production lines is low; lack of linkages between industrial clusters; the problem of wastewater treatment has not been paid attention.



Nguồn: - Niên giám thống kê tỉnh Thái Nguyên 2018

- Sở Công thương và Ban Quản lý các KCN tỉnh Thái Nguyên

Người thành lập: NCS Nguyễn Văn Long, 2020

**Figure 3.2. Reality map of industrial cluster development in Thai Nguyen province**

### **3.2.4. Industrial zone**

- In the province, there are 06 industrial zones with a total area of 1,420 hectares, including: Song Cong I, Song Cong II, Nam Pho Yen, Yen Binh, Diem Thuy, Quyet Thang. In which, there are 04 industrial zones in operation, 02 industrial zones are being built. The average industrial zone size is 200-300 hectares. The total industrial land area of the industrial zones is 592 hectares, accounting for 41.7% of the total planned land area, of which the industrial land leased area is 442 hectares, the average occupancy rate of the industrial zone reaches 74.7%.

- The year 2013 is an important turning point in the activities of attracting investment in industrial zones, especially attracting foreign investment. As of 2018, the industrial zones attracted 211 projects, of which 109 domestic projects with total investment capital of 15,000 billion dong; 102 foreign investment projects, total registered capital 8.16 billion USD. 150 projects have been put into operation with the implemented capital of 9,000 billion VND, the implemented foreign capital 83.5%.

- Before 2014, the industrial production value created by the industrial zones was limited, accounting for only 17.6% of the provincial industrial production value, since 2014, the industrial production value increased suddenly, reached 682,799.9 billion dong, accounting for 92.0%, contributing 7,067 billion dong to the provincial budget. The export value from industrial zones has also increased rapidly, from 15 million USD in 2013 to 25.0 billion USD in 2018.

- Also from 2014, there were more and more laborers in the industrial zones, in 2018 there were 112 thousand laborer, accounting for 45.6% of the total number of laborers in the whole industry. Average income is 7.5 million dong/person/month, especially in Samsung in Yen Binh industrial zone, the highest income is 9 million dong/person/month.

- Waste treatment systems in industrial zones have not been built and completed, and have ineffective systems for treating wastewater, solid waste and exhaust gases. Enterprises which implement well environmental problems are large ones, with effective management models and modern technology.

#### ***\* Evaluating the reality development of industrial zones in Thai Nguyen province***

The development of industrial zones has created a driving force to attract investment capital, especially FDI, promoting growth and change structure of economy. Industrial zones create a large volume of products with export value, contribute to the industrial production value of the province, promote scientific research and technology transfer. Solving employment problems for laborers with a decent and stable income. To step up the process of industrialization, urbanization and infrastructure development. However, the progress of liberating premises and building infrastructure is still slow; investment projects in industrial zones are mainly small projects with medium technology; technology equipment is not modern; laborers are mostly low-level laborers; Some enterprises in the industrial zone have not focused on the welfare of laborers, have not completed waste treatment construction.

### **3.2.5. Industrial center**

Before 2014, Thai Nguyen city was always the leading locality in the province, industrial production value and it's industrial center of the province, accounting for 50-60% of industrial production value. After 2014, the appearance of foreign investment projects in industrial zones and industrial clusters in Pho Yen town made the industrial production value of this locality increased rapidly, accounting for 91,3% whole province.

- State economic sector plays a key role in producing industry of industrial center Thai Nguyen city, in 2018 industrial production value reached 13,666.3 billion dong, accounting for 52.5% of the whole province, however, there is a tendency to decrease the proportion, instead of a rapid increase in the proportion of the foreign-invested sector.

- Industrial center Thai Nguyen city is place which concentrate a large number of production facilities and industrial enterprises with 2,060 production facilities (16.7% of the whole province) and 447 industrial enterprises (58.2% of the whole province). Industrial production activities attracted 3,710 laborers in industrial production facilities, 94,323 laborers in industrial enterprises, mainly engaged in producing consumer goods, metal and electrical products.

- The main industrial products of Industrial center Thai Nguyen city include: rolled steel, tin bars, clothes, processed tea, paperboard. The output of these products tends to increase thanks to production expansion and finding a foothold in the market.

#### ***\* The shift of Thai Nguyen industrial center from Thai Nguyen city to Pho Yen town***

In 2010, Thai Nguyen city led the whole province in industrial production value, accounting for 69.9%, Pho Yen town ranked third with 8.7%; by 2018, Pho Yen town rose strongly, accounting for 91.3% of industrial production value while Thai Nguyen city only accounted for 3.5%. Industrial production density of Pho Yen town leads the whole province with 2,616.6 million dong/km<sup>2</sup>, 22.4 times higher than Thai Nguyen city. In 2018, Pho Yen town had 1,858 industrial production facilities, 3,402 laborers in these facilities, 17,503 laborers in industrial enterprises. In Pho Yen town 98.9% of industrial production value belongs to the foreign invested sector, only 0.3% of the state production.

#### ***\* Evaluating the reality development of industrial center***

The industrial center has a great contribution to the industrial production value of the whole province. The industry structure is diversified based on the province's strengths; promote in-depth industrial development, capital investment and application of modern technologies; attracting a lot of domestic and foreign investment capital, which is the basis to carry out large-scale production activities, bringing high socio-economic efficiency; solving employment problems for laborers inside and outside the province, creating income, stabilizing the quality of life for laborers. However, the growth of the industrial center was mainly based on width; supporting industries are underdeveloped, the localization rate of products is relatively low; the value created in FDI projects mainly belongs to foreign countries; labor's skills are relatively low; depend heavily on raw materials and equipment imported from abroad; The development of the industrial center puts great pressure on the environment and the quality of the infrastructure.



### **3.3. Evaluating the reality of development of industrial territorial organization in Thai Nguyen province**

#### **3.3.1. Result**

The formation and development of industrial territorial organization forms has rapidly increased the scale of industrial production value, promoted growth, urbanization, industrialization and modernization. increase revenue, contribute to the provincial budget. Attracting many sources of investment capital, especially foreign investment. Complete and modernize infrastructure, increase spatial connectivity. Solving a large amount of jobs for laborers with relatively high and stable incomes, contributing to improving the quality of life for laborers.

#### **3.3.2. Restrictions still exist**

The occupancy rate of industrial clusters and industrial zones is low; the work of compensation and liberation premises is still slow; domestic enterprises and economic sectors invest in the forms of industrial territorial organizations have small-scale due to capital limitations; infrastructure, science and technology have not met the development requirements in the new context; labor is limited in skills, mainly participating in the processing and assembling stage, low added value; the waste treatment system is ineffective.

## **Chapter 4. SOLUTIONS FOR INDUSTRIAL TERRITORIAL ORGANIZATION IN THAI NGUYEN PROVINCE**

### **4.1. The basis for proposing the solution**

An important basis for proposing solutions to improve the efficiency of industrial territorial organization in Thai Nguyen province based on the master plan for industrial development of Vietnam to 2030; the master plan for socio-economic development in the Northern Midlands and Mountains region; industrial development planning of Thai Nguyen province; the reality of development of industrial territorial organization forms in Thai Nguyen province.

### **4.2. Targets and orientations for industrial territorial organization in Thai Nguyen province**

#### **4.2.1. Targets**

To prioritize attract investment to develop modern industries with high added value, which are the province's strength, creating a large product volume for export value. To focus on in-depth development, strongly changing the internal structure of the industry. To develop industrial clusters and industrial zones associated with the development of synchronous infrastructure systems and urban systems. Industrial GRDP reaches over dong 137,000 billion dong, the growth rate in the period 2025-2030 is over 14%; industrial production value reaches over 1995 trillion dong, the growth rate in the period 2025-2030 is over 10%.

#### **\* Targets of industrial cluster development**

In the period of 2021-2030, complete synchronous infrastructure according to detailed planning, filling the entire area of 28 industrial clusters invested in the previous period (total area 1056.4 hectares) and investing in 07 industrial clusters with an area of 202.13 hectares. The industrial clusters attract and create jobs for 600-800 laborers per year.



***\* Targets of industrial zone development***

The industrial production value in industrial zones increases by 20%/year on average compared to the provincial average; The average income of laborers is 9.8 million dong/person/month by 2025; export turnover reaches 53 billion USD; budget revenue 5,000 billion dong; create jobs for 150 thousand laborers; 100% of industrial enterprises have waste treatment systems meeting standards...

***\* Targets of industrial center development***

Developing industrial centers into development centers of Thai Nguyen and Northern Midland and Mountainous region in terms of a number of industries (high-tech industries such as: electronics, informatics, new materials, mechanical engineering); improve the competitiveness of industrial products; transform the structure of industrial products in the direction of forming key industrial products with high qualifications and competitiveness.

***4.2.2. Orientation for development of industrial territorial organization forms in Thai Nguyen province***

***\* Industrial development space***

To focus on developing industry in 3 sub-regions: The main driving force sub-regions include: Thai Nguyen city, Song Cong city, Pho Yen town, Phu Binh district; secondary driving force sub-regions include: Dong Hy, Phu Luong, Dai Tu districts; high mountain areas include: Vo Nhai, Dinh Hoa districts.

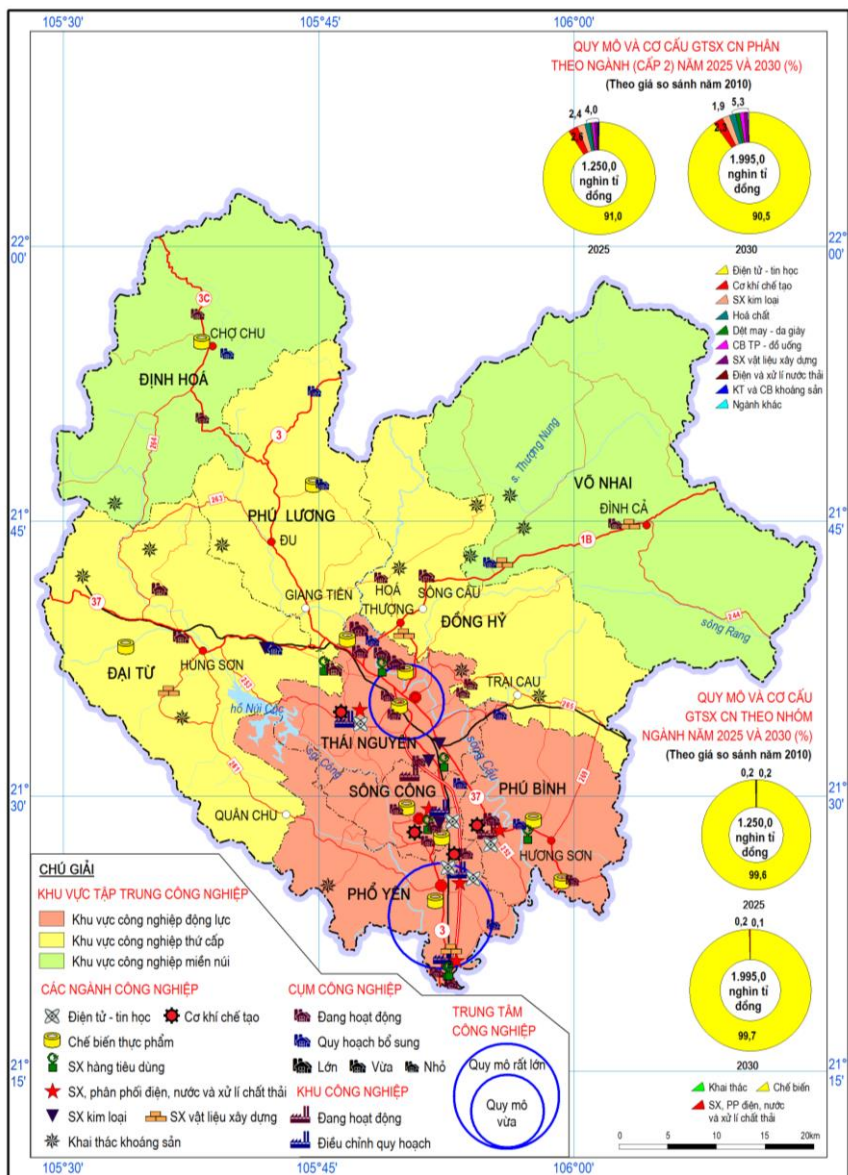
***\* Forms of industrial territorial organization***

- Focus on in-depth development of industrial enterprises, change the internal structure of industrial enterprises; enhancing the development of enterprises to serve industrialization-modernization agricultural and rural, supporting industrial enterprises; to change in the direction of rapidly increasing groups of industries and industrial products applying high technology.

- Developing industrial clusters into small and medium industrial centers in association with developing local industrial, and carry out industrialization-modernization agricultural and rural; building a close development association between the industrial zone and neighboring industrial clusters, creating a complete industrial development space, to form center for a number of important stages in industrial production chains.

- Formulating a list works and projects produce industry which are prioritized for investment in industrial zones; gather all resources to invest build of infrastructure works in the industrial zone; develop the industrial zone into a strong attraction for foreign investment.

- Developing Thai Nguyen industrial center into a major industrial center in the Northern Midland and Mountainous region, with a diversified industries structure, produce strong industrial production; focusing on investment in synchronous equipment, renew technology, improve labor productivity; making key investments, give priority to the development of products with competitive advantages, key industries; consolidating and enhancing the competitiveness of enterprises; developing industry in an environmentally friendly manner.



Nguồn: Quy hoạch phát triển công nghiệp tỉnh Thái Nguyên giai đoạn 2016 - 2025, tầm nhìn 2030

Người thành lập: NCS Nghiêm Văn Long, 2020

**Figure 4.1. Map of industrial development orientation and forms of industrial territorial organization in Thai Nguyen province**

### **4.3. Solutions for industrial territorial organization in Thai Nguyen province**

#### **4.3.1. General solution**

In order to improve the quality and efficiency of industrial territorial organization, it is necessary to synchronously implement groups of solutions: solutions to developing raw material areas; training human resource; attracting and encouraging all economic sectors to invest in developing industry; solutions of capital mobilization; solutions of scientific and technological; solutions of market; changing structure of internal industry; solutions for organization and management; promotion; solutions of protecting environment.

#### **4.3.2. Solutions for forms of industrial territorial organization**

##### **\* For enterprise**

Local governments need to implement groups of solutions to create a favorable business environment for enterprises, support them to have favorable conditions for production. For enterprises, it is necessary to focus on solutions to improve the capacity of enterprises, to carry out quality and efficient production activities.

##### **\* For industrial clusters**

Renovating policy mechanisms on land rental prices, enhancing the effectiveness of regulations on land policies; mobilizing all sources of investment capital for development; building investment incentive policies in order to step by step complete synchronous infrastructure; developing high-quality human resources; building linkages between enterprises in industrial clusters with vocational training institutions; to minimize polluting industrial facilities; encouraging scientific research activities on protecting environment.

##### **\* For industrial zones**

Building and completing policy mechanisms to attract investment for developing produce industry in industrial zones; completing and modernizing infrastructure, speeding up liberating premises activities; strengthening state management for investment activities, focusing on removing difficulties for enterprises in industrial zone; supporting, encouraging and creating favorable conditions for enterprises in industrial zone to train laborers; reviewing regulations on protecting environment; strengthen inspection, supervision and evaluation of the implementation of regulations on protecting environment in industrial zones; proceeding to form and develop ecological industrial zones.

##### **\* For industrial center**

Improve the quality of human resources to serve the development of the industrial center; step up the reform of administrative procedures, make appropriate development policy; investing in renovating equipment, using multi-storey technology, with priority given to modern technology; building and developing infrastructure to serve for industrial development of industrial center in a synchronous, modern and perfect way; actively expanding markets, especially goods import and export markets; promote trade promotion; strictly implementing the regulations on protecting environment; building completely and using effectively the waste treatment system.

## **CONCLUSION**

Industry is an economic sector that plays a very important role in the development of countries and territories in the world.

Vietnam is moving towards the industrialization-modernization goal, on that way, industry plays a driving role.

Thai Nguyen is an important economic, political, cultural and social center of the Northern Midlands and Mountains region, with many favorable conditions for industrial development.

In recent years, thanks to the good exploitation of these advantages, industry of Thai Nguyen province has developed strongly with many positive changes, achieving great results thanks to investment attraction activities.

Forms of industrial territorial organization in Thai Nguyen province have developed rapidly, effectively contributing to the industrial development of the province. However, in the course of operation, these forms still have certain limitations.

On the basis of the shortcomings and limitations in the process of industrial development and industrial territorial organization, the province needs to synchronously implement groups of solutions in a timely and effective manner in the coming time.