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SUSTAINABLE DEVELOPMENT OF VIETNAMESE INDUSTRIAL ZONES: CASE STUDY IN THAI BINH PROVINCE

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Sustainable development of industrial zones (IZ) is to ensure stable economic growth, the IZ themselves operate more efficiently and harmonious development of social aspects and environmental protection. Thus, the sustainable development of IZ should be considered in two aspects: the sustainability and effectiveness of IZ and the positive spillover effects of IZ on socio-economic activities of branches and localities where industrial zones operate. Based on the theories of sustainable development of industrial zones, the article uses the statistical method to describe the current situation of developing IZ in Thai Binh province in the period 2013-2017. A survey on 51 workers and 74 managers in enterprises operating in IZ of Thai Binh Province was conducted on the basis of Likert scale from 1 to 5 points (1: strongly disagree to 5: strongly agree) to assess the sustainability, efficiency and spillover effect of the IZ. The results indicate that the sustainable development of IZ in Thai Binh Province has ensured the link between economic development and the stability of community life, step by step industrialization and modernization of rural areas in Thai Binh Industrial Zones.

Keywords: Industrial zones, sustainable development, Thai Binh.

1. Introduction

With the aim of economic industrialization and modernization, Thai Binh Province should develop a system of industrial zones to ensure its sustainable development. The IZ development is considered as a driving force for the overall development of the province, creating a prerequisite for the equal development of sub - regions and localities in the province. In

addition, the IZ development promotes the economic restructuring, population and labor, modernization of agriculture and rural areas. As a result, the IZ development creates the favorable conditions for attracting investment in industrial development by increasing the contribution of industry to the socio-economic development of the province¹.

1. Decision No. 3494 / QD-UBND of Thai Binh People's Committee issued on April 28th, 2017 approving the project on adjusting and supplementing the development planning of the industrial zones in Thai Binh Province to 2020 and the period of 2020-2030

Up to now, Thai Binh Province has planned six industrial zones with the total area of 1,110.27 ha, of which there are 619.03 ha of the recovered land and 397.45 ha of leased land (reaching the occupancy rate of 84.6% of the recovered industrial land). The IZ have made significant contributions to increasing the proportion of industrial production value in GDP of Thai Binh province in recent years. The industrial production value has gradually increased over the years. Specifically, in 2017, its industrial production value reached VND 18,871,500 billion, increasing by 15% compared to that of 2016. The revenue of goods reached VND 22,016,320 billion, increasing by 0.7% compared to that of 2016. The export value reached USD 805.66 million, increasing by 17% compared to that of 2016, and the import value reached USD 658.440 million, increasing by 18% compared to that of 2016. The taxes and state budget remittances in 2017 reached VND1,685,152 billion.

The technology of the enterprises in Thai Binh Industrial Zones is generally at medium level. The technical infrastructure is quite complete with the waste treatment system up to the current standards of the Vietnam Ministry of Science, Technology and Environment. The environmental management is concerned by the industrial zones; particularly, the inspection and control of environmental pollution in the industrial zones has been noticed since the project establishment of industrial zones. In addition, the investors of the industrial zone infrastructure have paid attention to the construction of concentrated wastewater treatment plants, such as the waste water treatment plant in PhucKhanh Industrial Zone of Dai Tin

Company, the waste water treatment plant in Nguyen DucCanh Industrial Zone of Thai Binh Industrial Zone Service Center, the solid waste landfill in TienHai Industrial Zone, etc. These activities have contributed to decreasing the environmental pollution in the industrial zones in Thai Binh Province².

Despite the successes in recent years, the development of the industrial zones in Thai Binh Province has revealed some limitations, namely: (i) the planning of the industrial zones has been adjusted by the traffic planning; (ii) the investment in the industrial zone infrastructure has been not synchronous and slow; (iii) the business performance of IZs is not high; (iv) the environmental protection standards have been constantly improved but the environmental pollution in the industrial zones is increasing sharply and there has been no effective solution; (v) the system of policies for the sustainable development of IZs has been not synchronous and deficient. Therefore, the article focuses on assessing the sustainable development of the industrial zones in Thai Binh Province in the period 2013 - 2017, then gives some policy implications for the sustainable development of the industrial zones in Thai Binh Province.

2. Theoretical background

Sustainable development of industrial zones has been studied by many scientists in many different works. To clarify the theoretical framework related to the topic, we should firstly approach the general theories of IZ establishment and development.

Theory of industrial location: This theory was developed by an economist - Alfred Weber for explaining the formation of industrial zones based

2. Report on the development of industrial zones, industrial clusters, and the social infrastructure of industrial zones and industrial clusters in Thai Binh Province by the Management Boards of Economic Zones of IZs on April 27th, 2018

on the principle of saving transportation costs. The basic content of this theory involves spatial model of industrial distribution based on the principle of minimizing costs and maximizing profits. This theory aims to minimize the cost of transportation in the total cost of production in order to maximize the profitability of investors. Theory of industrial location is based on the fact that transport costs account for a large proportion of the cost of production as it relates to producers' transport of inputs and outputs. Therefore, the location of the production facility should be chosen in such a way that the cost of transportation is the highest. In addition, this theory clarifies the reason for the formation and development of IZs based on the arguments of centralized industrial production by territory, considering the process of forming industrial zones as a process of accumulation of production from This promotes the concentration of industrial production facilities in certain areas. However, this theory does not show the impacts of the policy system and state management agencies on sustainable development of industrial zones.

Theory of national advantage in industries and clusters: Porter (2002) gives his perspective on the formation of economic regions based on competitive advantage. According to him, competitiveness of a country depends on its creativity and dynamism. In particular, Porter believes that competitive advantage is understood as the industrial and national resources which enterprises in the world create their superior advantages compared to other direct competitors. Porter's competitive theory provides arguments for explaining why countries focus on developing specific industries and why businesses play an important role in shaping industry centers for global competitiveness. Also, this theory suggests the idea of attracting investment into IZs based on the com-

petitive advantage of enterprises rather than that of IZ itself.

Central place theory: According to Weber (1929), the advantages of territorial concentration with external advantages give manufacturing enterprises the ability to align their market size, then geographic concentration is formed by allocating enterprises closely in the market center. This concentration allows businesses to share the burden of infrastructure costs, especially transportation, electricity, water supply, and communications. Thus, enterprises can increase labor productivity by linking and supporting each other in their production and business. At the same time, this allows enterprises to specialize and collaborate for reducing their product costs and making reasonable and economical use of raw materials, energy and other inputs. This theory is worth noting in that it determines the spatial population distribution which allows planning of residential areas and newly exploited areas to be rationalized. In general, central place theory has practical significance and is the basis for the layout and construction of industrial zones by creating a foundation for the formation of residential areas and new urban areas in vacant lands adjacent to industrial zones.

Growth pole theory: This theory was introduced by a French economist - Francois Peroux in 1950, and was developed by Jabnoun et al. in 2003. Growth pole theory states that a region's economic development can not be even over all its areas in the same economic space and in the same time, but tends to grow most in some certain areas while others develop slower or less developed.

Also, this economic theory holds that industry and services play a major role in regional growth. Industrial and service concentration in urban areas support regional development. The development of such a

spearhead industry spells out the development of that region, leading to an increase in new jobs, income, and spending. As a result, new industries are more and more increasingly associated with service activities and new forms of investment.

Continuing this theory, Myrdal (1957), Hirshman (1958), Salvatore (1972), and Harry Richardson (1976,1979) [4] argue that the impact of growth pole is determined by both spillover effects and the effects of attracting or polarizing on economic growth, increasing per capita income and opportunity for economic development of surroundings. According to these authors, spillover effects involve in creating a vibrant commodity exchange environment as a major source of supply or a large market for technology transfer and renewal. At the same time, spillover effects contribute to upgrading facilities, promoting research and development of science and technology, and applying science and technology; thus, creating a change in awareness, culture, education and training, institutional development and other innovations in psychology of producers and consumers. As a result, an attractive environment for attracting investment is established through new activities, thus boosting investment in socio - economic infrastructure and urban development. In general, growth pole theory is useful for the selection of key areas for development.

In fact, sustainable development of industrial zones has been early concerned by many developed countries. Most of these countries have developed their strategies for developing industrial zones, in which IZ sustainable development is considered as a mandatory requirement, especially after the 1970s. A research by Roberts (2004) introduces a new concept of eco-industrial zones (EIZs) with specific criteria and evidence in Australian. The study has conducted surveys on the application of sustainable eco-industry model in

Queensland (Australian). Since then, the study has developed a set of planning principles and guidelines to facilitate the development of eco-industrial zones. The issue of sustainable development of industrial zones is also addressed in specific aspects such as technology and environment of the IZ. The study of Susan (2003), for example, examines the role of Chinese industrial zones in attracting modern technologies to produce quality goods for domestic and international market.

In Vietnam, recent studies have focused on analyzing and assessing sustainable development of industrial zones. These studies have shown the achievements, limitations and causes of limitations in the development of industrial zones; hence, suggesting recommendations for IZ sustainable development. Typically, the study by Vu Thanh Huong (2010) analyzes the situation of sustainable development of industrial zones in the northern focal economic zone by pointing out the unsustainable development of the industrial zone and the causes of this issue. On that basis, this study proposes recommendations for developing the northern focal economic zone in a sustainable manner. Le The Gioi (2008) assesses IZ development in two aspects, namely: (i) intrinsic sustainability of IZs, and (ii) spillover effects on economy in general. In addition, the domestic researches focus on proposing recommendations for sustainable development of industrial zones on three pillars, including: economy, society and environment. Le Van Dinh (2009) confirms that the development of industrial zones as an indispensable process contributing to the renovation of the provinces. However, in his study, he points out social issues arising from the development of industrial zones. Specifically, he believes that these social issues may have a positive or negative impact on quality of community life. This requires relevant authorities to

take measures to promote or prevent them to ensure community sustainable development.

Nguyen Binh Giang (2012) argues that the development of industrial zones in Vietnam is considered as an indispensable process for the industrialization and modernization. Along with the economic impact, he studies the positive and negative social impacts of industrial zone development in specific aspects, such as: (i) employment and occupation; (ii) income and living standards; (iii) demographics; (iv) opportunities for consumption and public services; (v) urbanization and infrastructure; (vi) social security; (vii) environment and health; and (viii) culture and traditional values.

Based on analyzing the theoretical framework related to the development of industrial zones, this study approaches the growth pole theory to consider the sustainable development of industrial zones. Basically, sustainable development of industrial zones is to ensure the harmony between stable economic growth of industrial zones with social development and environmental protection. Thus, sustainable development of industrial zones should be considered in two aspects: (i) sustainability, performance of IZs and (ii) spillover effects.

Firstly, to assess the sustainability and performance of industrial zones, it is possible to use some indicators on scale and growth rate of output value, production and business efficiency, export turnover, production capacity, level of production technology applied, average income and contributions to the country and the locality (such as taxes, fees, social security contributions of enterprises in IZs ...).

Secondly, sustainable development of industrial zones should create positive spillover effects on socio-economic development of localities with industrial zones. In particular, the development of industrial zones creates a shift in the structure of the local econ-

omy in line with the trend of increasing the proportion of industry and services, and reducing the proportion of agriculture. As a result, this shift enhances competitiveness in the domestic market and facilitates export. In addition, the IZ development has had a positive impact on the development of economic, technical and social infrastructure in localities where industrial zones operate. Besides, IZ development has a positive impact on improving the life quality of local people by reducing negative impacts on social issues, solving employment and increasing income of employees. At the same time, the development of industrial zones must minimize pollution by improving the ecological environment

3. Research methodology

Data collection methods: This study uses both primary and secondary data to research the sustainable development of the industrial zones in Thai Binh Province. The secondary data involve IZs and socio-economic development in Thai Binh Province in the period of 2013-2017. The secondary data was collected from Thai Binh Statistical Yearbook, the reports of Thai Binh People's Committee, departments, Thai Binh's Management Board of IZ, etc. In addition, a survey was conducted on individuals and organizations, including workers working in the industrial zones and enterprises operating in the industrial zones in Thai Binh Province for collecting the primary data. The respondents give their answers by marking the Likert scale from 1 to 5 (1: Strongly disagree; 5: Strongly agree). Also, we conducted some face-to-face interviews with some leaders of the IZ management board and some employees working in the industrial zones in Thai Binh Province to further the primary information.

Research sample: We conducted the survey by distributing directly the questionnaires to 60 employees and 80 enterprises operating in the industrial zones in

Thai Binh Province. The number of valid questionnaires is 125 (including 51 responses of the employees and 74 ones of the enterprises). Next, we use Excel to synthesize and process the data collected, then conduct the analysis and assessment of the survey results. The sample survey is detailed in six industrial zones as shown in Table 1 below:

Government; tax incentives; and supporting to the enterprises on labor training... Thus, Thai Binh Province has become an attractive investment environment for investors. Currently, Thai Binh Province has six industrial zones in the total of 10 planned industrial zones, including: PhucKhanh Industrial Zone, Nguyen DucCanh Industrial Zone, TienHai Industrial

Table 1: Description of survey sample

Industrial zones	Enterprise		Employee	
	Number	Prop. (%)	Number	Prop. (%)
PhucKhanh Industrial Zone	22	30	15	30
Nguyen DucCanh Industrial Zone	23	32	16	31
TienHai Industrial Zone	10	14	5	10
Song Tra Industrial Zone	7	9	6	12
CauNghin Industrial Zone	6	8	5	10
Gia Le Industrial Zone	5	6	4	7
Total	74	100	51	100

Data processing and analysis methods: This study mainly uses the methods of descriptive statistics, investigating, comparing and analyzing logically the data collected. The sustainable development of IZs in Thai Binh Province is analyzed in two aspects, namely: (i) sustainability and performance of IZs and (ii) spillover effects.

4. Research results on sustainable development of industrial zones in Thai Binh Province

4.1. Sustainability and performance of industrial zones in Thai Binh Province

In recent years, Thai Binh Province has paid much attention to the industrial development with the focus on developing concentrated industrial zones. Specifically, Thai Binh Province has issued many policies to attract investment in its industrial zones, such as: supporting investors with 50% of funding for site clearing and leveling; preferential land rent price is based on the lowest price bracket set by the Vietnam

Zone, Gia Le Industrial Zone, CauNghin Industrial Zone and Song Tra Industrial Zone. In particular, Nguyen DucCanh Industrial Zone, PhucKhanh Industrial Zone and Gia Le Industrial Zone have fully reached their occupancy rate. TienHai Industrial Zone has its occupancy rate of 60-70%; CauNghin Industrial Zone and Song Tra Industrial Zone have their occupancy rates of 35-40%.

To attract investment in the IZs and create favorable conditions for the implementation of investment projects, the Thai Binh People's Committee has assigned the Management Board of the economic zones and industrial zones with the land compensation and resettlement for IZ land. The IZs have been located in areas with great potentialities and development advantages (near the main roads). Also, the scale of the industrial zones has been in accordance with the socio-economic development objectives of each period. Currently, Thai Binh Province has had 174 investment

projects in industrial zones with total investment capital of over VND 27,539.49 billion, of which 142 ones coming into operation, 12 ones under construction, 04 ones unfinished, and 16 ones suspended. The industrial production value of the IZ enterprises has increased on average from 15-19%, accounting for over 40% of the province's industrial production value. Also, the import and export value has increased by 16-17% a year, contributing nearly VND 1,700 billion to the State budget, and providing jobs for nearly 60,000 workers³.

To assess the sustainability and performance of the industrial zones in Thai Binh Province, the study will look at the following criteria:

Firstly, the geographic location of the industrial zones in Thai Binh Province.

Thai Binh is an agricultural province, located in the Red River Delta, which plays an important role in socio-economic development and national defense and security. The economy of Thai Binh Province is directly influenced by the economic growth triangle of Hanoi - HaiPhong - QuangNinh. Therefore, the selection of the IZ location is decisive for the sustainable development of the industrial zones. In particular, the location of the industrial zones directly influences the access to the input and output markets for the industrial enterprises. With good location, so, the businesses can save costs, improve labor productivity, and improve product quality and competitiveness. Based on the actual situation of the industrial zones in Thai Binh Province, it can be said that the industrial zones have been conveniently located, ensuring the sustainable

development of the industrial zones by considering the future expansion of the industrial zones.

Secondly, the planning quality of the industrial zones in Thai Binh Province.

In general, the planning quality of the industrial zones in Thai Binh Province is considered as reasonable, which can meet the sustainable development objectives, such as: building functional zones, technical infrastructure, basic services (such as electricity, water, information) and some other services (telecommunications, banking and finance). Particularly, the services such as electricity and water have been given priority to the IZs to encourage and facilitate the investors. Also, other services such as information, telecommunications, finance, customs... are accessible and easy for the industrial zones. Concerning the functional areas, Thai Binh Province has focused on the investment in the solid waste collection areas and the wastewater treatment centers for all industrial zones.

Thirdly, the land area and the occupancy rate of the industrial zone in Thai Binh Province.

IZ area is considered as one of the determinants of the sustainability and performance by influencing number of projects attracted investment, number of employees and demand for raw materials and services. For IZ infrastructure investors, IZ size also directly determines their business targets, such as: revenue and profit. However, this factor is affected by investors' financial capacity, natural land area, as well as socio-economic development plan of localities where industrial zones operate. Up to now, there are six industrial zones in Thai Binh Province with a total area of 979.9 ha. The area of recovered natural land is 636.85 ha; of

3. Report on the development of industrial zones, industrial clusters and the situation of social infrastructure development of IZs and ICs in Thai Binh Province by the Management Boards of Economic Zones and IZs on April 27th, 2018.

Table 2: Area and occupancy rate of the IZs in Thai Binh Province by 2017

No.	Industrial zone	Planning area (ha)	Occupancy rate compared to planning area (%)	Leveled area (ha)	Occupancy rate compared to leveled area (%)
1	Phuc Khanh Industrial zone	120	100	114.27	100
2	Nguyen Duc Canh Industrial zone	68.4	100	66.28	100
3	TienHai Industrial zone	446	54.67	74.97	39
4	Song Tra Industrial zone	200	54.5	94.3	13
5	CauNghin Industrial zone	214	50.46	156.8	94
6	Gia Le Industrial zone	84.7	100	85.0	100
Total area of industrial zones		979.9		229.5	
Average area / IZ		163.3			
Average occupancy rate of industrial zones		81.34			

(Source: Thai Binh Management Board of Economic Zones and Industrial Zones and our calculations)

which, the industrial land for lease is 463.25 hectares (379.8 ha has been leased, the average occupancy rate of the industrial zones is 81.34 ha); the remaining area not been leased is 77.81 ha (of which, Song Tra Industrial Zone is 42.61 ha, Cau Nghin Industrial Zone is 31 ha, and Gia Le Industrial Zone is 4.2 ha). Thus, the industrial zones of Thai Binh Province have now a relatively small area, on average only about 163.3 ha / IZ. In general, the industrial zones in Thai Binh Province are much smaller than those of other provinces in the North Vietnam, such as: Bac Ninh, Hung Yen, Hai Duong, VinhPhuc, etc. (According to the 2017 survey, IZs in the Red River Delta provinces have an average area of over 315 ha / IZ⁴).

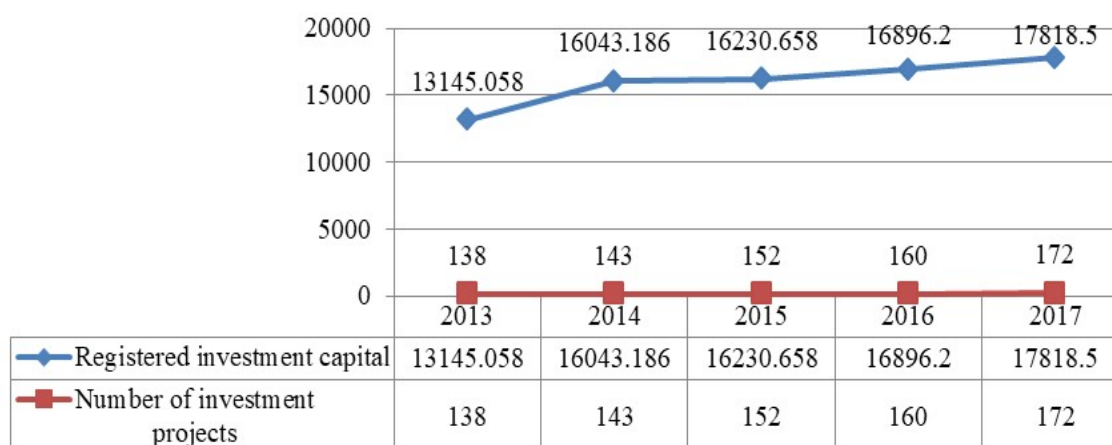
IZ occupancy rate indicates the level of land use in IZs, measured by the ratio of leased IZ area to total IZ area. Therefore, this indicator shows the level of attractiveness and the ability to attract IZ infrastructure investors. Of the 6 IZs currently operating in Thai Binh

Province, only three ones have been filled, accounting for 100% of the planning area (including PhucKhanh Industrial Zone, Nguyen DucCanh Industrial Zone and Gia Le Industrial Zone). CauNghin Industrial Zone has reached the occupancy rate of 94%. Only TienHai Industrial Zone and SongTra Industrial Zone have a low occupancy rate of less than 50%. Currently, most of the industrial zones in Thai Binh Province are made partial investment, that is, the land leveling for rent is partially implemented and depends on the needs of the secondary businesses. This type of landfill has the advantage of saving investment costs by using capital effectively; however, it is very difficult to synchronously implement the items of the IZs, leading to obstacles to investor sentiment.

Fourthly, the investment incentive / attraction policy in Thai Binh Province.

In recent years, the attracting investment in industrial zones in Thai Binh Province has achieved many

4. Report on the development of Vietnam's IZs by the Vietnam Ministry of Planning and Investment in 2017



(Source: Thai Binh Management Board of Economic Zones and Industrial Zones)

Figure 1: Project number and amount of registered investment capital in Izs

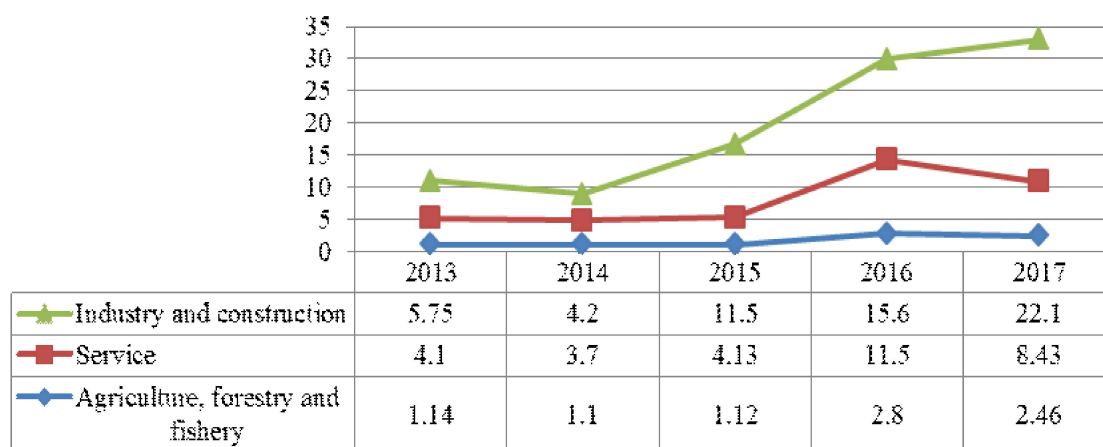
encouraging results. The Thai Binh Management Board of Economic Zones has implemented many investment promotion programs both inside and outside the country; and has taken initiative in coordinating with the People's Committees of the districts and cities where the IZs are located to support in the planning, tax policies, investment preferences, land rent, labor, etc. This activity allows the IZ enterprises to boost their production and business. In addition, the Thai Binh Management Board of Economic Zones has actively implemented the planning of development of industrial zones by directing the accelerated investment in the IZ infrastructure construction. Also, the investment inspection, supervision and the law implementation are concerned to promote the production and business of the IZ enterprises. In addition, the administrative reform has been carried out seriously, the record processing time has been mainly on time and less than the time prescribed. Therefore, in the period 2013 - 2017, Thai Binh Province has increased by more than 20% of the project number and by nearly 70% of the investment capital compared to those of the period 2008 - 2012 (Figure 1).

Fifthly, the results of production and business activities of the industrial zones in Thai Binh Province.

The development of the industrial zones has contributed to Thai Binh Province's economic growth and restructuring. The attraction of domestic and foreign investment in the industrial zones has boosted the economic growth of the province by increasing the industrial production value. The strong development of IZs has a positive impact on the economic restructuring of Thai Binh Province in the direction of increasing service industries (Figure 2).

In the period of 2013 - 2017, the average annual growth rate of the industrial production value of the industrial zones in Thai Binh Province is 14.1%; and the average annual value of the industrial production of the industrial zones accounts for 40% of Thai Binh Province's industrial value. In addition, the import-export turnover of the industrial zones has been increasing at a high rate, accounting for 49.24% of the province's export value and accounting for 44% of the province's import value (Table 3 and 4).

Tables 3 and 4 show that the export turnovers are always greater than the import turnovers. It can be estimated that the annual export volume is quite large. This



Source: Thai Binh People's Committee

Figure 2: Contribution of each economic sector (%)

Table 3: Export turnover of IZs compared to that of the whole Thai Binh Province

Criteria	Unit	2013	2014	2015	2016	2017	Mean
Export of IZ enterprises	Million dollars	428	514	590	688.6	805.66	3,026.26
Export of the whole province	Million dollars	995.35	1,127.2	1,266.09	1,296.4	1,400	6,085.04
Rate of Export of IZ enterprises to Export of the whole province	%	43	45.6	46.6	53	58	49.24

(Source: Thai Binh Statistical Yearbook from 2013 to 2017)

Table 4: Import turnover of IZs compared to that of the whole Thai Binh Province

Criteria	Unit	2013	2014	2015	2016	2017	Mean
Import of IZ enterprises	Million dollars	312	432	480	558	658.44	2,508.44
Import of the whole province	Million dollars	896.8	1,189.9	1,151.9	1,166.1	1,300	5,704.7
Rate of Import of IZ enterprises to Import of the whole province	%	35	36	42	48	51	44

(Source: Thai Binh Statistical Yearbook from 2013 to 2017)

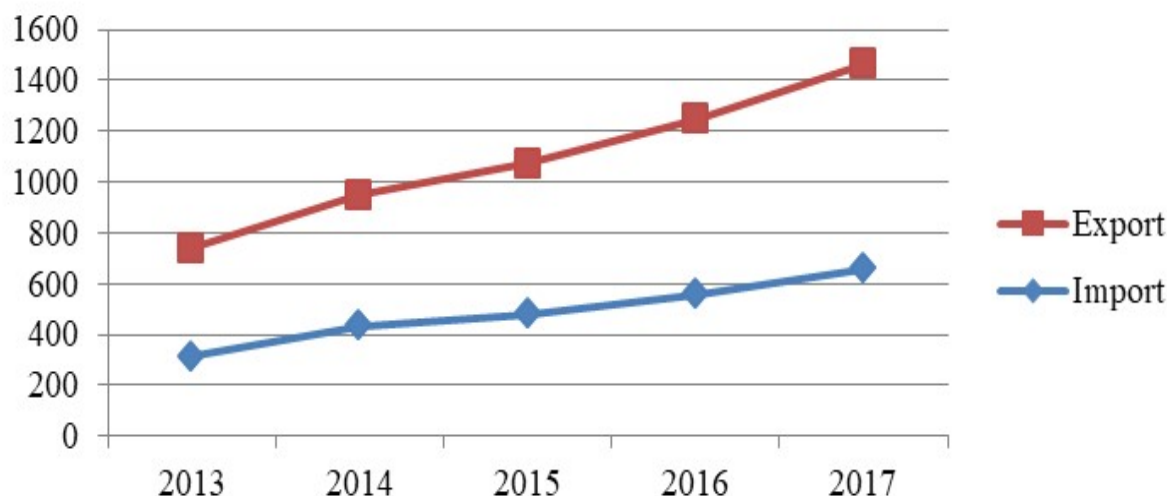


Figure 3: Quantity of imported and exported goods of the IZ enterprises

is a good sign for the enterprises in the industrial zone in particular and in Thai Binh Province in general.

In the period of 2013 - 2017, the IZ enterprises' average annual contribution to the provincial budget increases by 6.3%. Specifically, this contribution reached VND 138.3 billion in 2013 and VND 530.26 billion in 2017.

4.2. Positive spillover effects of industrial zones on the economy - society of Thai Binh Province

Firstly, the industrial zones in Thai Binh Province have provided the community stable jobs.

According to the survey results on the laborers working in the industrial zones in Thai Binh Province, since the establishment of the industrial zones, most of the families have worked as employees at the IZ enterprises. In particular, many households have all of the working-age members working in the industrial zones. This is a very good signal for the shift of labor struc-

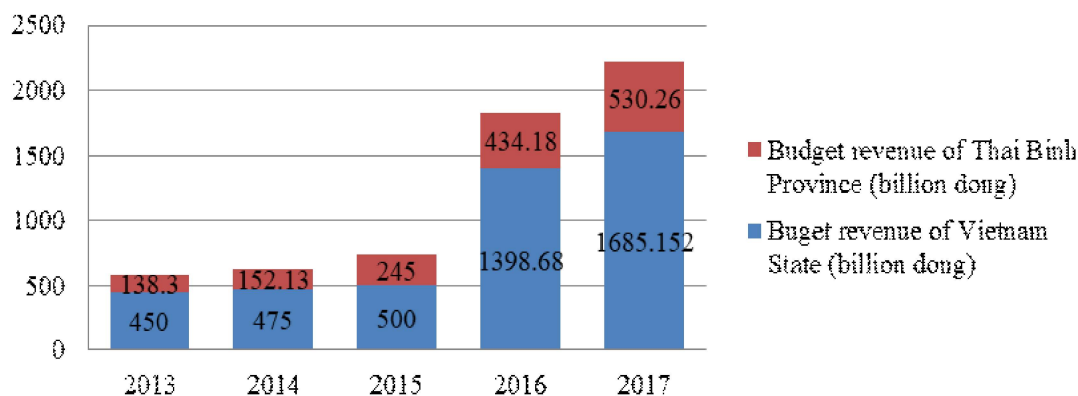


Figure 4: Budget revenue of the industrial zones in the period of 2013-2017

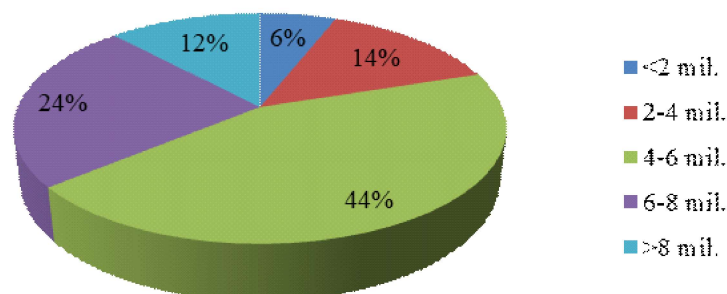


Figure 5: Households' income increase compared to that in the past

ture and in line with the general economic restructuring of the province. For the enterprise survey participants, the two criteria of creating jobs for laborers and attracting more labors are assessed at the highest scores among the impact criteria of the IZs on the enterprises, respectively 4.23/5 points and 3.92/5 points. This confirms the important role of the industrial zones in creating jobs for laborers in Thai Binh Province.

Secondly, the industrial zones in Thai Binh Province have increased employees' income.

It can not be denied the pioneering role of industrial zones in providing jobs by increasing laborers' monthly income that is much higher than that of agriculture. At the same time, the IZ development has become a driver of the economic growth as well as the growth of living standard for the community, contributing greatly to the successful implementation of one of the important targets of new rural development for communes and districts where the industrial zones are located. According to the enterprise survey results, the criterion of increasing income for employees is assessed with the second highest average score (4.02/5 points). This implies that the IZ enterprises are paying more attention to increasing their employees' income.

Our survey results on the households' income increase compared to that in the past is shown in

Figure 5.

Figure 5 shows that the participation of workers in IZs has helped them to have an increase in their income at a relatively high level, mainly at 4 to 6 million dong per month, accounting for 44% of the total number of employees participating in our survey.

Thirdly, the workers working in the industrial zones have improved their life quality and enjoy insurance.

The income increase of the workers and people around the IZ contributes to improving the life quality in the community. According to the survey results on the people living in some communes where the industrial zones are working, most of the people think that thanks to the income of their family members working in the industrial zones, their daily life is gradually better. In addition, the services for the spiritual life for people, such as: business of fashion, cosmetics, food, massage, entertainment area... have been more and more developed. This contributes to improving not only the spiritual life of the workers but also the life quality of the community.

Working in the IZs has allowed many employees to take better care of themselves through their enterprises' insurance policy. 74% of the workers participating in our survey highly appreciate the timeliness of the insurance regime for employees in their enter-

prises, and only 6% of the workers show their unacceptable attitude with the timeliness of their enterprises' insurance regime. In general, the survey results show that the employees' good assessments on the enterprise policies. As a result, the enterprises can enhance their credibility and fulfill their social responsibility (Figure 6).

Ventilation and Air Conditioning Technology; Car technology; Industrial electricity; Repairing techniques; Computer assembly; Civil electricity; Fashion apparel; Fashion Design, Industrial Electronics; Office computing; Wood sculpture; Operation of construction machines; Operation of road surface construction machines; Corporate

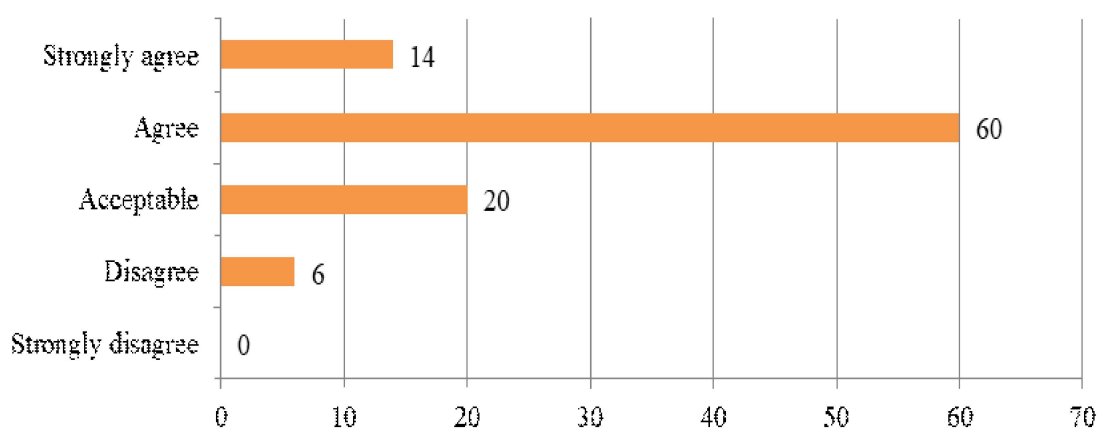


Figure 6: Employees' assessment on the insurance regime

Fourthly, the IZ development have developed the system of schools, hospitals and other types of local services.

In 2017, Thai Binh Province has 30 vocational education institutions, including 04 colleges, 07 middle schools and 19 centers. In addition, there are other institutions involving in vocational training, such as: enterprises, universities... Notably, all of eight districts of Thai Binh Province have public facilities of vocational education. The training occupations provided by the colleges, middle schools and other institutions include: Welding technology;

accounting; Community service; Agriculture; Construction; Health; Culture and Arts.

The training institutions of Thai Binh Province annually provide 23,000 workers to the labor market. In the recent years, Thai Binh Health Department has actively cooperated with the Thai Binh Management Board of Industrial Zones and the People's Committees of the districts and city for implementing the medical activities for IZ workers, such as: health examination, labor protection, labor safety, labor hygiene, etc. Currently, most of the factories in the industrial zones have medical offices and medical section⁵.

5. Report on the development of IZs, ICs and social infrastructure of IZs and ICs in Thai Binh Province by the Management Board of Economic Zones of IZs on April 27th, 2018

The survey results show that 86% of the workers highly appreciate the IZ development which has contributed to promoting the development of the system of schools, hospitals and other types of local services. Thus, it can be said that the system of medical facilities and hospitals has better and better met the IZ workers' needs of health examination and treatment. This is a two-way impact between the IZ development and the establishment of health facilities, indicating the indispensability of urbanization and labor restructuring in Thai Binh Province (Figure 7).

related regimes such as salary policy, insurance, subsidies, fines, disciplines, etc.

The survey results show that the change in the perception and working style of the workers in the industrial zones of Thai Binh Province is quite positive. The workers have the ability to learn, quickly catch up with work and industrial production. According to our survey results, the enterprises in the industrial zones in Thai Binh Province assess at the relatively good score about the production discipline and specialization of the employees (71.14% of the enterprises participated in the survey agree and strongly agree) (Figure 8).

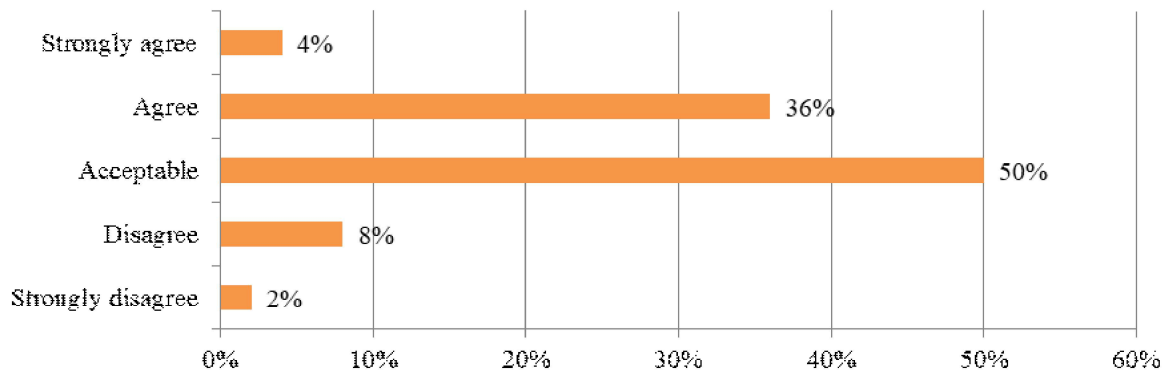


Figure 7: *Workers' satisfaction with the impact of the industrial zones on local living environment change*

Fifthly, the workers in the industrial zones have access to professional working environment.

The laborers working in the industrial zones in Thai Binh Province are mostly from agriculture; so, their working style is not good, influencing their thinking. Specifically, in traditional farming practices, working time and place depend on farmers and weather (eg: heavy rains, storms, droughts, cold weather, etc.). However, in working environment of enterprises, they are forced to strictly comply with the regulations of the business on working time, vacation time and

Sixthly, the IZs have contributed to the environmental pollution treatment in Thai Binh Province.

The industrial zones in Thai Binh Province have developed at a fast pace and are associated with the economic and labor restructuring for the past 20 years. The increase in the number of IZ enterprises has resulted in the undesirable impacts on the environment. However, the environmental issue has been controlled by the right policy, modern planning and the unity of local authorities, enterprises, community and workers in the industrial zones.

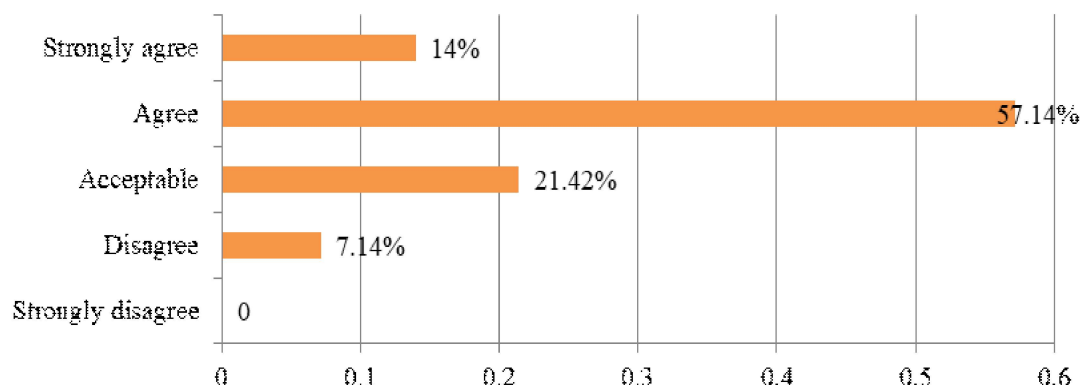


Figure 8: *Assessment of the IZ enterprises on facilitating access to professional working environment for their workers*

The IZs in Thai Binh Province's contributions to the treatment of environmental pollution include: (i) the policy system related to the IZ operation (including environmental protection policies inside and outside the industrial zones) has been improved on the basis of harmonizing the benefits between localities - enterprises - community; and (ii) Thai Binh Province has paid special attention to the investment in waste treatment projects during the planning of industrial zones, thus contributing to limiting environmental pollution in the industrial zones and residential areas.

At present, three out of six industrial zones in Thai Binh Province have completed the construction of a waste water collection and treatment system with the standard grade A (namely: PhucKhanh Industrial Zone, Nguyen DucCanh Industrial Zone and Gia Le Industrial Zone). This wastewater treatment system has been designed to be installed in accordance with the regulations of the automatic wastewater monitoring system. Thus, it can thoroughly collect and treat waste water of these three IZs. In addition, CauNghin Industrial Zone and TienHai Industrial Zone are constructing concentrated plants of waste water treatment and drainage canals.

For the treatment of solid waste in the industrial zones in Thai Binh city, solid waste is collected, transported and treated by One Member Limited Liability Company of Thai Binh City Public Works and Environment. In TienHai Industrial Zone, the enterprises have been transporting and burying garbage to the concentrated burial area since TienHai - Dong Chau Road was built. As a result, the dumping of waste indiscriminately along the road has been partially resolved.

5. Conclusion and legislative implications

This article studies the sustainable development of the industrial zones in Thai Binh Province concerning economic, social and environmental aspects. In addition, the article uses a set of specific criteria, including: (i) economic criteria; (ii) social criteria; (iii) environmental criteria; and (iv) combining with the survey results of some relevant indicators for assessing the sustainable development of the industrial zones in Thai Binh Province.

There are two basic theoretical contents in this study, including: (i) the theoretical framework for sustainable development of industrial zones; and (ii) the criteria for assessing IZ sustainable development based on the concept of sustainable development of IZs,

namely: (i) performance of IZs and (2) spillover effects of IZs.

The research results show that the sustainable development of the industrial zones in Thai Binh Province is consistent with the theories and related studies. Firstly, the IZs play a key role in the economic growth, contributing to the socio-economic development of the province. The development of the industrial zones has attracted the participation of economic sectors by encouraging investors (including foreign investors) to invest in the development of industrial production. Secondly, the investment in industrial zones is increasing in number of projects, scale and technology; at the same time, the field of investment is increasingly diversified. Thirdly, the industrial zones have brought jobs to many workers with stable incomes. Thus, the labor structure has been shifted by increasing the proportion of industrial and service labors, and reducing the proportion of rural agricultural labors.

For the sustainable development of the industrial zones in Thai Binh Province, some recommendations should be implemented as follows:

(i) Renovating the method of attracting investment. To mobilize and effectively use the investment capital, the investment in the construction of IZ technical infrastructure should be conducted in the form of direct investment or business cooperation contract or investment with state budget;

(ii) Mobilizing many different capital sources for investing the IZ infrastructure, including: capital of construction and infrastructure investors; advanced capital of IZ infrastructure investors; budget of the Province; mobilized capital of secondary investors and central support fund;

(iii) Improving the investment environment, such as: Promoting the reform of administrative procedures, promulgating the policies on land rent, incentives for construction and trade in IZ infrastructure, etc.;

(iv) Developing the economic policy solutions to attract investment in the IZ infrastructure construction and industrial development in the industrial zones;

(v) Strengthening the environmental management in the industrial zones, such as: synchronously implementing the investment in industrial solid waste treatment facilities; supporting the infrastructure investors the procedures to access investment capital for environmental protection; establishing environmental monitoring systems in the industrial zones; establishing the mechanisms of setting up environmental service enterprises for serving the industrial zones;

(vi) Investing in the human resources for the IZ development, such as prioritizing recruitment of the local labors and labors from displaced households for IZ development land; providing short-term vocational training to workers in the industrial zones, etc.

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hiệu quả ngày càng cao của KCN và phát triển hài hòa với các mặt xã hội và bảo vệ môi trường. Như vậy, phát triển bền vững các KCN phải được xem xét trên hai góc độ: tính bền vững, hiệu quả của KCN và tính tác động lan tỏa tích cực của KCN đến các hoạt động kinh tế - xã hội của các ngành, địa phương, khu vực có KCN hoạt động. Trên cơ sở lý luận về phát triển bền vững các KCN, bài viết sử dụng phương pháp thống kê, mô tả để phân tích thực trạng phát triển các KCN trên địa bàn tỉnh Thái Bình trong giai đoạn 2013-2017 dựa trên kết quả điều tra của 51 người lao động và 74 nhà quản lý tại các doanh nghiệp đang hoạt động trong các KCN trên địa bàn tỉnh Thái Bình trên cơ sở thang đo Likert từ 1 đến 5 điểm (1: Rất không đồng ý đến 5: Rất đồng ý). Kết quả nghiên cứu cho thấy phát triển các KCN bền vững đã đảm bảo kinh tế gắn liền với ổn định đời sống và dân cư, từng bước công nghiệp hóa và hiện đại hóa nông thôn các KCN tỉnh Thái Bình.

Summary

Phát triển bền vững các khu công nghiệp (KCN) là việc bảo đảm sự tăng trưởng kinh tế ổn định, có

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