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SUGGESTIONS AND REGULATIONS FOR DESIGNING, PLANNING AND CONSTRUCTING INDUSTRIAL PARKS; A CASE STUDY OF VIETNAM

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ABSTRACT: On the basis of experiences in designing, planning and constructing industrial zones in Vietnam, this paper aimed to give some suggestions and regulations for designing. The study used the qualititative method with synthesis and explanatory methods. Resources usage and environmental protection are more effective, while maximal economic and social benefits are simultaneously targeted. A concept of developing eco-industrial parks has established and evolved through time, and planning and constructing industrial zones based on current regulations in the nation. As a result of different researches, there is a need to pay attention to network cloud service, big data service and investment management and meet some standards such as 100% of newly built industrial clusters have wastewater treatment stations that meet relevant national standards or technical regulations, etc. as well as certain principles such as 3R (Recycle, Reduce, Reuse). Operation services should include: cloud-based service operation providing basic cloud rental services, such as cloud hosting, cloud desktop, cloud disk, virtual data center, container services, collaborative development and Open API; SaaS Operation Service; APP Store; and space operation service to make full use of digital showrooms and free space resources, providing reservation and rental services, and demonstration services.

KEYWORDS: Eco-Industrial Parks, Experiences, Designing and Constructing

INTRODUCTION

Until now, according to PLAN no. 85/KH-UBND related to management, investment and development of industrial clusters in Hanoi city in 2022:

Deploy investment in construction of technical infrastructure of industrial clusters that have already been established

- Organize the start of construction and completion of technical infrastructure; attract secondary investment projects in production and business activities in 45 industrial clusters that have already been established, including:

+ 02 industrial clusters established according to Joint Circular No. 31/2012/TTLT-BCT-BKHĐT dated October 10, 2012 of the Inter-Ministry: Industry and Trade - Planning and Investment guiding the handling of formed industrial clusters before the Regulation on management of industrial clusters promulgated together with Decision No. 105/2009/QD-TTg dated August 19, 2009 of the Prime Minister took effect (Binh Minh - Cao Vien industrial cluster, Thanh Oai district , CN3 industrial cluster, Soc Son district);

+ 43 industrial clusters were established in the period of 2018 - 2020.

- Focus on implementing solutions to remove difficulties and obstacles, create the most favorable conditions for investors to shorten the time to carry out investment procedures, speed up the progress of construction, and start construction to build technical infrastructure and put into operation industrial clusters in the city.

4. Development and establishment of new industrial clusters

- Promote investment promotion and advertising activities.

- Completing the appraisal and deciding on the establishment and expansion of 15-20 new industrial clusters.

Research questions

Question 1: What are current regulations in constructing industrial parks in the nation?

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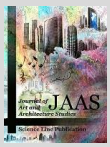

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Question 2: What are experiences and references of other countries in the world?

This study aimed to draw out lessons from other countries in constructing industrial parks for emerging economies such as Vietnam, based on their current situation analysis.

Previous studies

Firstly Huy [1] pointed we need risk management standards and Ha et al. [2] and Dat et al. [3] confirmed. Next, Table 1 shows summary of related studies.

Table 1 - Summary of previous studies

Authors	Content, results
Breschi and Malerba in 2001 [4]	Brought a type of economic agglomeration, clusters are formed by firms that conduct activities in the same field and in which innovation is an important force that fuels the competition and the firm's development.
Morosini in 2004 [5]	Gave another definition by describing the cluster as —socioeconomic entity characterized by a social community of people and a population of economic agents localized in close proximity in a specific geographic region
Xing et al. in 2017 [6]	Stated that a 7R framework that provides an updated base to assess, develop and compare Eco-Industrial Parks (EIPs) was developed and preliminarily checked with secondary data from the Suzhou Industrial Park, which enables relevant benchmarking among EIPs all over the world. Secondly, different typologies of industrial parks in China provinces were analysed and related role changes were described. The 13th Five-Year Plan on National Economic and Social Development, called for the third generation of EIPs, as enablers of sustainability and balanced development of urbanization in an eco-city that combines industrial growth with city development. Therefore, corporate, consumer and citizen social responsibility (coined as 3CSR) are attached to pursuing economic growth, social progress, and environmental sustainability. This research sets the scene for significant CE future developments, by leveraging the role of modern eco-cities through EIPs guided by a new conceptual model (7R)
Zong et al. in 2018 [7]	Discussed the application services for industrial park digitalization including operation service, property service, corporate service and life service, and explains the management of park digitalization such as safety and security of industrial park digitalization discusses the application services for industrial park digitalization including operation service, property service, corporate service and life service, and explains the management of park digitalization such as safety and security of industrial park digitalization discusses the application services for industrial park digitalization including operation service, property service, corporate service and life service, and explains the management of park digitalization such as safety and security of industrial park digitalization discusses the application services for industrial park digitalization including operation service, property service, corporate service and life service, and explains the management of park digitalization such as safety and security of industrial park digitalization discusses the application services for industrial park digitalization including operation service, property service, corporate service and life service, and explains the management of park digitalization such as safety and security of industrial park digitalization This paper also discusses the application services for industrial park digitalization including operation service, property service, corporate service and life service, and explains the management of park digitalization such as safety and security of industrial park digitalization Mention application services for industrial parks digitalization including operation service, property service, corporate service and life service, safety and security.
Thach et al. in 2021 [8]	They stated that roles of banks need to be enhanced to support such economic activities. They paid attention to technology quality management of the industry 4.0 and cybersecurity risk management on current banking activities

*source: author analysis

METHODOLOGY

Here authors will use analysis, experiences, observations, practical situation with cases studies of industrial clusters in Hanoi, Vietnam, but it also uses will use qualitative, analysis, synthesis research methods. Relevant regulations and plans of clusters in Hanoi also researched.

Data was prepared from real cases and regulations of industrial zones in Hanoi city (Figure 1) and method will be mainly qualitative analysis and synthesis method used.

Figure 1. Industrial zones in Hanoi city (source: internet)

RESULTS AND DISCUSSION

Construction regulations of the State's industrial parks

First issue: Fully meeting the standards and regulations of the State is a prerequisite for the construction of an industrial park. These contents are based on the national technical regulation on construction planning - QCVN 01:2019/BXD. Accordingly, the industrial park must ensure:

Requirements on environmental protection and safety, minimizing adverse effects on the urban environment

For production facilities and warehouses with hazardous levels of level I and level II, they must be located far from civil areas. Toxic level and environmental safety distance (ATMT) comply with the regulations of the Ministry of Science and Technology; or must be determined by an environmental impact assessment tool, or based on similar projects. Within the ATMT distance, at least 50% of the land area must be planted with trees. Not more than 40% of the land area will be arranged for parking, pumping stations, wastewater treatment stations, and solid waste transfer stations. Construction land must be planned in accordance with the potential for industrial development, the master plan for socio-economic development and relevant development strategies of each urban area. The ratio of land types in an industrial park depends on the type and nature of the industrial park, the area module of the land lots for the construction of factories and warehouses. The maximum net construction density in the land lot for building factories and warehouses is 60%.

All areas subject to planning such as industrial parks (industrial clusters), high-tech parks, and export processing zones must meet safety and environmental protection requirements. Minimize the negative impact on the surrounding environment.

Planning must be carried out outside the construction area of factories, production facilities and warehouses with hazardous levels of grade I or grade II. The determination of the hazardous level and the safe distance must absolutely comply with the regulations of the Ministry of Science and Technology.

NOTE: For cases where there is no environmental impact assessment or similar projects as a standard, the values listed in Appendix 3 of TCVN 4449:1987 can be used for reference.

Second issue: Clean, green and safe industrial park planning

QCXDVN 01:2008/BXD emphasized the requirement to: "Arrange the works in accordance with topographical, geological and landscape conditions, in harmony with other architectural ensembles in the urban area". Also in it are clear regulations on the arrangement of groups of public trees in the form of parks, flower gardens, water surfaces, groups of trees along the route that mainly create shade, prevent dust and noise, and groups of trees isolated from the surrounding areas of different specific standards.

When the trend of sustainable development is recognized by the whole world, the planning of green, clean, safe and humane industrial parks is inevitable. The density of trees in each industrial land lot, the treatment of wastewater, industrial waste and sludge, and the criteria for measuring pollution levels need to be clarified and detailed. The environmental monitoring unit is responsible for accurate measurements while the Ministry of Natural Resources and Environment in conjunction with the Ministry of Construction facilitates and encourages green and clean industrial parks to develop across the country.

Third issue: Building factories, whether large or small, on land owned by enterprises or the state, must apply for a construction permit. This is stipulated in Clause 1, Article 89 of the Law on Construction (amended in 2020) as follows: “Before starting work construction, the investor must obtain a construction permit issued by a competent state agency. Rights granted in accordance with this Law.”

The process of applying for a permit to build a factory in an industrial park

After preparing all the papers, documents, and procedures to apply for a factory construction permit, the process of applying for a construction

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permit will be carried out as follows:

Step 1: Prepare the required documents.

Step 2: Submit the application file at the Receipt and Return Department of the People's Committee of the commune or ward.

Step 3: The City's Urban Management Division receives the dossier and conducts verification, and submits it to the City People's Committee for licensing.

Step 4: Organizations and individuals receive permits at the Department of receiving and returning results of the City People's Committee. Time to appraise and receive permits is from 10 to 15 working days.

References to constructing industrial parks in the world

Firstly, Cote and Rosenthal [9] mentioned Sustainability requires a consideration of the social or community dimension as well as ecological integrity and economic efficiency. Further, ecological systems emphasize interaction and interdependence. Definitions of eco-industrial parks have begun to address this by referring to them as communities of business. The paper describes a number of initiatives, particularly in the United States and Canada. The types of interactions among businesses and between businesses and the community are described and initiatives are categorized as engineering or self-designing.

Secondly, Zong et al. [7] pointed:

Network cloud service

Build and operate a public service platform for enterprises and individuals in the park to provide full-service for SaaS service providers.

Individuals in the park, provide full-service for SaaS service providers

Operation services should include: cloud-based service operation providing basic cloud rental services, such as cloud hosting, cloud desktop, cloud disk, virtual data center, container services, collaborative development and Open

API; SaaS Operation Service; APP Store; and space operation service to make full use of digital showrooms and free space resources, providing reservation and rental services, and demonstration services individuals in the park to provide full-service for SaaS service providers. Operation services should include: cloud-based service operation providing basic cloud rental services, such as cloud hosting, cloud desktop, cloud disk, virtual data center, container services, collaborative development and Open API; SaaS Operation Service; APP Store; and space operation service to make full use of digital showrooms and free space resources, providing reservation and rental services, and demonstration services.

Big data service

Organize and integrate different industries in the park, and provide a complete product system for the planning, decision-making, supervision, and servicing of these industries.

Investment management

Manage the entire life cycle of investment promotion activities, with main functions including customer management, investment contract management and rent management.

Main functions including customer management, investment contract management, and rent management product system for the planning, decision-making, supervision, and servicing of these industries.

Big data services should include: collection of data related to industrial big data, including basic data in various fields, domestic and foreign industrial development information, industrial chain development data, regional economic data, corporate data, subject matter data, and supporting data; general supporting platform services for industrial big data; and various types of software services for users such as all levels of government, parks, and enterprise. And third, an Industrial Park can be classified as an Eco-Industrial Park (EIP) if the community of businesses cooperate with each other, sharing resources [10] and, leading to economic gains, gains in environmental quality and equitable enhancement of human resources for the business and local community" [11]. So, these businesses seek enhanced environmental, economic, and social performance through collaboration in managing environmental and resource issues, including energy, water, and materials.

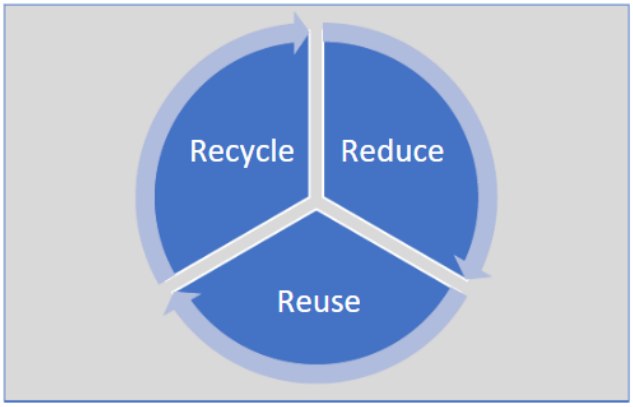

Figure 2. 3R principle in Ips

CONCLUSION

The results of the Plan No. 85/KH-UBND dated 16/3/2022 to MANAGEMENT, INVESTMENT AND DEVELOPMENT OF INDUSTRIAL Clusters IN HANOI CITY IN 2022; are used to build, complete and upgrade the technical infrastructure system of industrial clusters in operation (including: internal traffic, sidewalks, trees, water supply, drainage, wastewater and waste treatment. solid, power supply, public lighting, internal communication, operator, protective fence and other works serving the operation of industrial clusters) in the fence of industrial clusters to meet the requirements Decree No. 68/2017/ND-CP dated May 25, 2017 of the Government on management and development of industrial clusters;

- Continue to organize the start of construction of technical infrastructure for 41 industrial clusters that have been decided to establish in the period of 2019 - 2020;

- Decide on the establishment and expansion of 15-20 new industrial clusters;

- Adding 04 new industrial clusters to the master plan on development of industrial clusters up to 2020, with a vision to 2030;

- 100% of industrial clusters in operation are managed and operated in accordance with the law on management and development of industrial clusters;

- 100% of newly built industrial clusters have wastewater treatment stations that meet relevant national standards or technical regulations;

- 100% of industrial clusters, industrial clusters of craft villages that have been put into operation have wastewater treatment stations that meet relevant national standards or technical regulations.

DECLARATIONS

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Authors' Contributions

Conceptualization done by Nguyen Dinh Trung, Le Thi Han; Formal analysis done by Nguyen Trong Diep, Nguyen Dinh Trung; and Project administration done by Le Thi Han.

Research limitation

Authors may analyse in details experiences from Singapore and European countries

Conflicts of interest

There is no conflict of interest.

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