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SCIENCE BASED INDUSTRIAL PARK PLANNING AT SERPONG, INDONESIA

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Envisioning the industrial development of Indonesia, especially as part of its effort to shift from predominantly agriculture to industrialized country, a Science Based Industrial Park (SBIP) is planned to be developed as a part of the Science Based City (SBC) at Serpong. The role of this Science Based Industrial Park is to become the initiation for promotion of industries with advanced technologies through synergistic linkages with National /Public research institution, in this case PUSPIPTEK, and science and engineering oriented higher education institutes. This development become a model of regional development and a method that can be applied in simillar regional development especially in Indonesia.

Keywords: *Science Based Industrial Park, Science Based City, Indonesia, Serpong, Industrial Infrastructure, Regional Development.*

1. INTRODUCTION

The name of Science Based Industrial Park is not a well defined term, which might lead to different perception. The basic idea of this park is to become a center where industrial research and development (R&D) activities and manufacturing activities that have a relatively high technological contents are located in one area of development. The park's intention is to realize effective tie between applied research and manufacturing, by using the linkages with nearby universities and national /public research institute. To best illustrate the term of SBIP, is by looking at the Hsinchu Science-based Industrial Park in Taiwan (HSIP) example. The Agency for the Assessment and Application of Technology (BPP Teknologi), studies the planning of this industrial infrastructure in the effort of promoting development and application of technology to elevate industrial and national development.

The Development of Science Based Industrial Park is a part of the Science Based City Planning Serpong which would be the first of regional development type and expected to become a development trend to stimulate the industrial especially the countries the science and technology development.

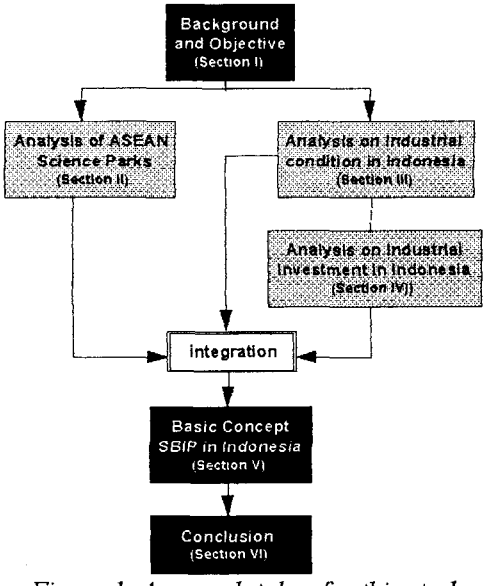

Figure 1. Approach taken for this study

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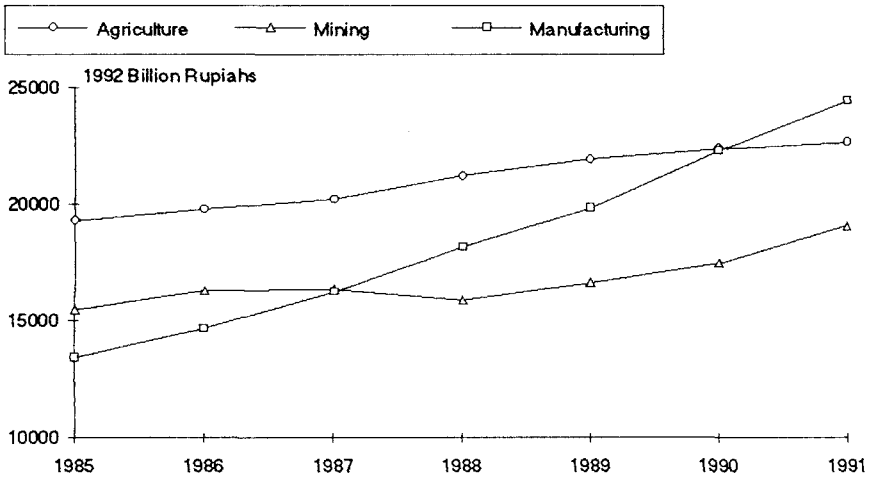


Figure 2. GDP Balance of Manufacturing, Mining and Agriculture

Source : Central Bureau of Statistic Indonesia

2. INDUSTRIAL CONDITION IN INDONESIA

In its scenario of transforming from predominantly agricultural country into a technologically and industrially developed country, whithin the past years Indonesia concentrated in the development industrial sector, especially in manufacturing products and tries to become less depended on the petrolium industries. The GDP ballance between Agriculture, Mining and Manufacturing in figure 2. shows the evidence of the evolution of the nation's economy, in which the manufacturing have a share of 16% in 1985 increased to 21% in 1991 of the entire GDP. The transformation of Indonesia's economic structure will continue to go on with the characteristics of the expansion of the industrial sector in the economy.

The Characteristics of the present industrial structure in Indonesia can be seen in the fact that the industries comprises of a small number of large companies and a large number of small and medium companies. Conserning the industrial condition, the main issue that need to be resolve is to reduce the gap, especially of the technological competence, between the large / big companies and the small and medium companies. Large companies, included the national strategic companies, have a relatively high technology capabilities. But the manufacturing output of these industries in producing product still quite small, within 5% of the total manufacturing output, and have a slow increment with the grow annually from 1985 to 1991 at the rate of 13%. While industries with low and medium technological capabilities grew at the rate of 16% and 15%, with a bigger share of the manufacturing output, figure 3.

The low output of the of the large industries is due to lack of support from the small and medium industries, which can not catch up with the requirement of large company.

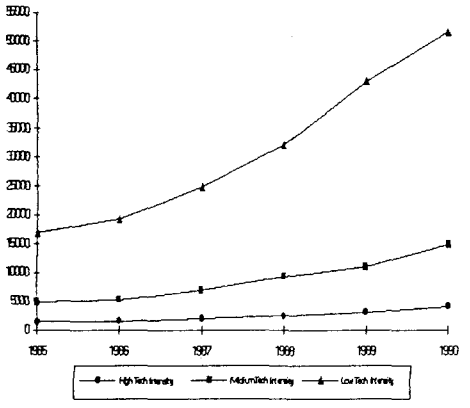


Figure 3. Manufacturing output by technology intensity
Source : Central Bureau of Statistic Indonesia

ries) to posses a more advanced technology capabilities, especially through intensification of technological capabilities exist in small and medium industries and/or creation of technological power to these industries. Inline with the increasing of the manufacturing activities, Industrial infrastructure were also developed which can be seen through the development of industrial estate in various part to accomodate the demand of industrial location. The emerging of this industrial estate, does not functioned to foster the technological advancement of the indsutries. For this reason the Science Based Industrial Park with the role of improving the state of the industrial technology in Indonesia become important.

3. Case study of Science Cities in Other Asian Countries

Many industrialized and industrializing countries in the East Asian countries have or having Science Cities, as shown in Table 1. Science City is expected to play a significant role to accelerate the shift of the industrial structure from the labor intensive lower value added industries to the technology oriented higher value added industries, as shown in Figure 4.

It was identified the following findings by this case study ;

a. Most of the industrial countries as well as some ASEAN contries that just started their industrialization recently have already constructed or been constructing Science City developed by Government.

b. The first Science Cities in nations were established in the period of the high growth rate of manufacturing GDP (higher than 11% growth rate)

c. They were established at the industrialization stage in which the GDP share of manufacturing has already increased (higher than 24% share)

According to the Figure 5, Indonesia seems to be still in the comparatively premature industrialization stage as whole country. Considering Java island that domestic industries are mostly concentrated, however, it is obvious that the industrialization stage shift to up-right direction in the Figure. Jointly taking its long process to develop Science City into account, from a macro viewpoint of the national industrialization analysis, it can be concluded that it is a good timing for the Indonesian Government to start preparation for the Science City development.

Table 1 List of the first Science City established in Asian Countries

Country	Name of Science Park	Opening Year	Mfg. GDP Share to total GDP in opening year	Growth rate of mfg. GDP for the last 5 years
Japan	Tsukuba Science City	1973	26.45	*1 11.41
Korea	Daedok Science Town	1978	24.15	18.16
Taiwan	Hsinchu Science Based Industrial Park	1980	40.43	12.72
Singapore	Singapore Science Park	1981	30.94	13.60
Malaysia	Kedah Science Park	1992	*2 30.80	*2 14.69
Thailand	Thai S&T Park (under construction)	1994	*2 28.48	*2 11.29
Indonesia	Serpong Science Based City (under planning)	(1991)	*3 19.93	*3 10.78

Source : *World Bank Report 1992 (except Taiwan)*
: *Statistical Yearbook of The Republic of China 1991 (for Taiwan)*

NOTE :
*1. Average growth rate for the last 3 years (1971-1973)
*2. Estimation based on 1989-1991 data by the assumption of the same growth rate
*3. The latest statistics to indicate the present condition in Indonesia

Fig. 4 Model of Industrialization path Needs of Science City

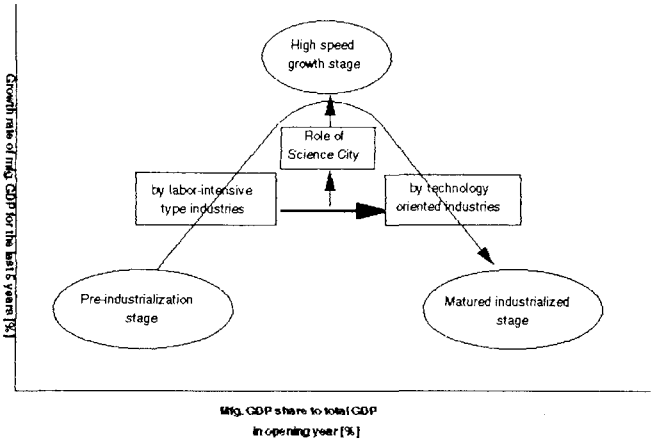
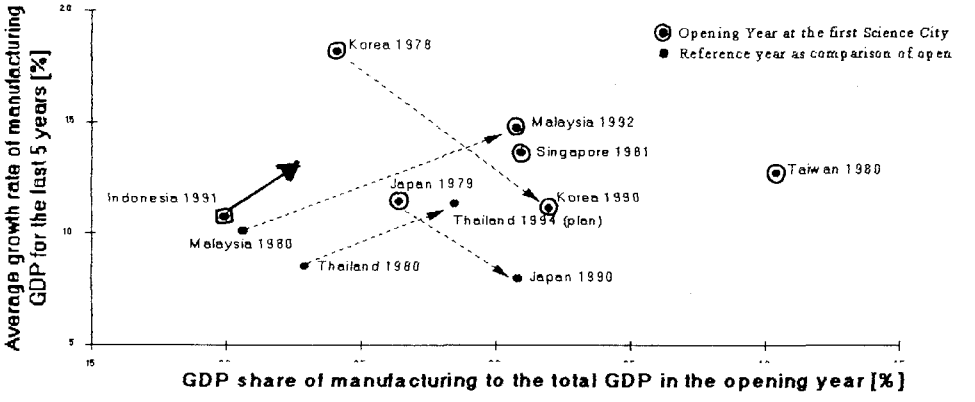


Fig. 5 Comparison of Industrialization stage at establishment of the first Science City in Asian Countries



4. Company Interviews for SBIP Master Plan

4.1. Objective and Approach

The objectives of the company interviews is to understand the real industrial demand of SBIP, based on the preliminary SBIP master plan, and to reflect these findings to the master plan in order to meet the needs from industries.

All interviews were done by visiting top executives in charge on R&D and/or overseas business in the leading company of each industrial field. Number of companies interviewed was 22, among which 12 companies, hereafter existing group, are under operation in Indonesia and 10 are potential investors with long overseas production experiences except in Indonesia. The results is summarized in Table 2.

4.2. Overall Findings

a. Most of industries appreciate the project ideas of SBIP in conjunction with the national needs to strengthen the Indonesian industrial structure.
b. The major concerns from the highest average score are investment incentives, hardware infrastructure, business/living infrastructure, human resource development/recruitment, rather than PUSPIPTEK and SBIP center facilities.
c. However, the existing group relatively shows the keen interest in use of PUSPIPTEK facilities/equipment and SBIP center facilities such as computer, manufacturing, and information center, since these are their present constraints to improve their R&D and production capabilities.

4.3. Findings from Potential Investors.

a. Most of companies interviewed give the highest priority to China, because of its huge domestic market and various favorable industrial conditions such as human resources, incentives, industrial growth speed.
b. Many companies show their interest in Indonesia as well, but mostly next to China.
c. Although Indonesia has many attractive investment conditions including labor cost, domestic market size, political stability, free fund repatriation, and natural resource, it is pointed out that there are the following existing constraints;
   - human resources, especially engineers and managers class
   - government related procedure, which is not clear, inefficient, and not stable
   - investment incentives
   - infrastructure, especially power and logistics
   - supporting and related industries
d. All the above constraints could be solved in SBC, if items recommended in the master plan are implemented, by which Indonesia could be one of the most attractive countries in the region.

4.4. Findings from Existing Group

a. Although the demand to strengthen and expand their R&D activities does exist, their constraints are a lack of R&D staff and facilities, which implies the urgent necessities to cooperate with PUSPIPTEK.
b. For location of their R&D facilities, however, they prefer their existing site to SBIP at this moment.
c. The business constraints of existing group are as same as ones of potential investors.

4.5. Summary of Interview

Most of the serious constraints raised by industries can be solved but functions and facilities to be provided by SBC, by which not only SBIP but also Indonesia could be internationally competitive in terms of direct investment climate.

Industries expect PUSPITEK to play important roles to support industries by means of use of lab facilities/functions, joint researcher, and human resource development.

Besides various service offered by SBIP and PUSPITEK such as infrastructure, center facilities, incentives and lab facilities, it is also expected for SBC to provide them with high level city function and to play an interface to universities, local industries, suppliers of supporting services such as warehouse, banking, and insurance.

Table 2 Result of Company Interview

	Average Score		
Location conditions of SBIP	**Existing Group**	**Potential Investors**	**Total**
Location	1.83	2.00	1.91
Use of lab facilities	2.25	1.40	1.86
Use of lab functions	1.92	1.20	1.59
Joint research with lab	1.42	1.30	1.36
Conference hall	1.08	1.00	1.05
Infrastructure			
High quality power supply	2.50	3.00	2.73
High quality water supply	2.50	2.80	2.64
Area air-conditioning system	1.67	1.60	1.64
Area public transportation	2.08	1.90	2.00
SBIP center facilities			
Computer facilities	2.00	1.30	1.68
Manufacturing facilities	2.00	1.20	1.64
Ind. information center	1.92	1.80	1.86
Consulting services	1.58	1.40	1.50
Training services	2.17	1.70	1.95
Incentives for SBIP tenants			
One stop service	2.08	2.80	2.41
100% foreign equity participation	2.33	2.20	2.25
Corporate tax holiday	2.58	2.90	2.73
Import-export tax exemption	2.58	3.00	2.77
Others			
Recruitment from nearby Univ.	2.50	2.40	2.45
Cooperation with nearby Univ.	1.92	2.10	2.00
Employee's housing supply	1.83	2.30	2.05
High level amenity/sports facilities	1.92	1.70	1.82
Living cond (education, security)	2.17	2.90	2.50
Support facilities (warehouse, bank)	2.58	3.00	2.77
Cooperation system with local ind.	2.42	2.00	2.23
NOTE			
Scores indicate as follows ;			
3 : very important			
2 : important			
1 : not so important			

5. Development Strategy

SBIP can avail itself of the large-scale facilities at the SBC Center such as the research facilities, laboratories, and information network. It has a mutually beneficial relationship with the other important components of SBC Center. For example, PUSPIPTEK laboratories for PUSPIPTEK to apply the results of its research. Educational institutions in the area can provide SBIP with dynamic scientist and engineers and other personnel while SBIP gives financial support and accommodate students for on-the-job training.

As national center to strengthen Indonesia's industrial development, SBIP needs to cultivate an environment conductive to scientific and technological research and development. This could be achieved in the following manner :

1) Consolidation of R&D Facilities

This will attract small and medium scale industries to set up theis plants / factories in the area. Moreover, the scale effect would generate more planning and development activities.

2) High-grade Infrastructure

Provision of clean water, uninterrupted power supply and cogeneration system through high-grade infrastructure would be an irresistable attraction to technology-oriented companies.

3) SBIP Interface with the World / Indonesia / Jakarta

SBIP interface with the world canm be achieved by setting up an information network resulting in the acquasition of the latest research and development techniques while a link with Jakarta/Indonesia is in terms of an ef-

ficient road and transportation network.

4) Provision of Urban -Type Amenities

This includes recreational/commercial facilities, parks, and other incentives designed to make the lives of scientists engineers, and other skilled workers staying in SBIP as pleasent and as comfortable as possible.

5) Supporting Service and Incentives

Investment climate in Indonesia is still less attractive, compared to other Asian countries, as shown in table 3. Considering a significant contribution of SBIP tenants to industrial development in Indonesia, a special incentive package should be provided. In addition, to smoothen various Government related procedure, which industries point out as the most serious constraint, SBIP should also provide investors with one stop service in which all procedure can be completed at one place.

Table 3 Comparison of Industrialization Stage at Establishment of the First Science City in Asian Countries

When 100% of the total volume manufactured is exported, the allowed equity % for foreign investors is

Indonesia	Max 95%
Thailand	Max 100%
Malaysia	Max 100%
Philippines	Max 100%
China	Max 100%
Vietnam	Max 100%

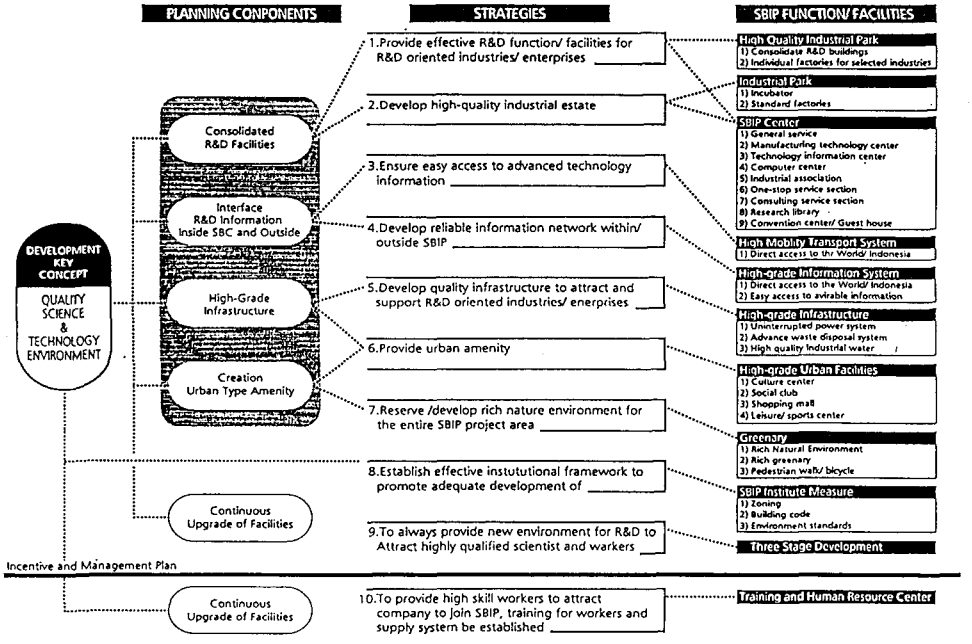
Corporate tax holiday in number of years

Export ratio	Indonesia	Thailand	Malaysia	Philippines	China	Vietnam
100%	0	3 - 8	5 - 10	4 - 8	2	2 (4)
less than 100%	0	3 - 5	5 - 10	4 - 8	2	2
Since when		After making profit	After starting production	After starting production	After making profit	After making profit
Tax ratio	35%	30%	35%	35%	15%	15~20% (10) ( ) in EPZ

Import tax exemption

Export ratio	Indonesia	Thailand	Malaysia	Philippines	China	Vietnam
100%	100%	100%	100%	100%	100%	100%
less than 100%	50% 0% after 2 years	50%	100% only for products exported	100% only for products exported	100%	100%

Fig.6 DEVELOPMENT STRATEGY



6. Conclusion

This paper presents our approch to construct the Master Plan for SBIP, which will accelerate industrial development in Indonesia. It can be summarized as follows;

1. The development direction of SBC was proposed in relation to the present achievement of economic development to Indonesia, referring to science cities in other Asian countries.
2. The concept of SBC development was elaborated, based on the analysis of industrialization trend of Indonesia.
3. The plan reflects the constraints and problems raised through company interviews in order to maximize the impact by private investment
4. The development scenario was proposed, based on the above identification.

Because of limitation of the space, other important issues, which most of developing countries are facing, will be presented at seminar. These include managerial issue, shortage of development budget, environmental problems.

Refference :

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