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- A Case Study of the Java Region**

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Strengthening Cluster Building in Developing Country alongside the Triple Helix: Challenge for Indonesian Clusters - A Case Study of the Java Region

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Introduction: Aims and Background

This paper is a component of my conceptual foundation paper due to PhD field work in Indonesia to understand the possibility and the chance for developing country such as Indonesia to strengthen cluster building alongside The Triple Helix model within the region of Java. This paper is a conceptual paper based on case study in Indonesia related to the Triple Helix and cluster approach for chosen Industrial Clusters in Java. In this paper, the focus will be on six selected industrial clusters across the Java region. They are Gresik Industrial District in East Java, Tugu Wijaya Semarang in Central Java, Sentul Bogor in West Java, Jababeka in Bekasi, Kujang Industrial District, and Kawasan Berikat Nusantara in Jakarta.

In conjunction with the fact in Indonesian industrial condition, Indonesian government initiated the setting up of industrial district which later known as

industrial cluster to make existence easier for both domestic and international investors by providing all necessary infrastructure, facilities and housing in one safe location - at a reasonable cost - thus providing a secure base for industry and manufacturing.

Regarding clustering approach, Indonesia has a very long tradition of SMEs (Small and Medium Sized Enterprises) cluster around similar activities. In 2002, the cluster comprised approximately 3700 firms mostly SMEs employing 58.000 permanent workers (Loebis and Schmitz, 2005). They are usually craft industries and export oriented driven. About 70% of the cluster production is exported while the rest is sold on the domestic markets.

However, little is known about the critical success factors that determine economic development of cities and regions and empirical studies that draw lessons for policy are scarce (Tichy, 1998), specifically for implementing cluster approach in industry/manufacturing sector in Indonesia. Moreover, there are good reasons to doubt to what extent a purely sectoral view is adequate to analyse region economic growth and to design policies. There are many indications that urban economic growth increasingly seems to emerge from fruitful cooperation between economic actors, who form innovative networks. It is in these geographically concentrated network configurations, or 'cluster' that value-added and employment growth in urban regions is realised. This demands a new policy approach in urban economic development, specifically for Indonesian study.

Accordingly, it is motivating to investigate the process of cluster building in industrial district in Java region as the important region due to economic, social, and political condition. Thus, details can be read in the following section within this paper.

Methodology

Building robust cluster, it needs encouraging policy from government, as in the developing country, policy tools to form robust industrial clusters might be generally oriented toward the establishment of the basis technology infrastructure due to lack of

an innovative capability of knowledge creativity and diffusion institutions. It is contrast with developed countries, where policy associated with innovative clusters are likely to be focused on knowledge sharing, such as building networks, increasing cooperative R&D, strategic alliances (Tichy, 1998).

Moreover, it is also necessary to take into account the role of international organizations that have been playing an active role as consultant in helping to set up industrial policy along with government. Some of them are UNIDO, ADB, World Bank, and international developing agency from Japan (i.e. Japan International Cooperation Agency). Their roles have been playing significantly important in term of producing guidelines, conducting pilot research as well as disseminating discourse regarding cluster and competitive advantage for Indonesia.

Additionally, researcher chooses empirical research which draws on experience or observation of primary evidence from secondary data in order to understand a phenomenon being studied as well as conducting field research where to meet relevant employees' representatives from the six chosen clusters in Indonesia for collecting new evidence. This evidence tends to be qualitative even though this research will use appropriate statistical data to quantify relevant findings in the field.

Accordingly, the second level choice is the researcher approaches the work as interpretivist by conducting case study. The interpretivist or qualitative approach has been chosen by considering the following statements:

1. The aim is to provide an in-depth understanding of the world of the research subjects;
2. Generally uses small samples that are deliberately selected for particular criteria which is not random;
3. Evidence collection methods that typically involve close contact between the researcher and the subjects being studied;
4. Evidence which is detailed, information rich and extensive;
5. Analysis that is generally open to emergent concepts and ideas.

As it has been said by Yin (1989) that the case study allows the investigators to concentrate on specific instances in an attempt to identify detailed interactive processes which may be crucial. Accordingly, this research will use case study as a research tactic, which will track the process of implementing the idea of cluster in six industrial clusters across the Java.

In conjunction with data collection, the research will then involve semi structured interviews with key management and employee representatives of the six chosen industrial clusters, representatives from Indonesian ministry of Industry and Trade, representatives from chosen international organization based in Jakarta, and examination of relevant documentation, and observation. Additionally, to get the data from university perspective, semi-structured interview will be held in each chosen University in six provinces within Java region. Thus, the relevant opinion from academia will be taken into account in shaping the finding related to Triple Helix.

The case study will be conducted on the basis of a contextual data about the cluster theories along with the use of triple helix model, in which the networks between different actors are involved. This case study will be a descriptive case study which can be used to illustrate cases through typical or representative. In policy-oriented research descriptive case studies can be used to illustrate good or bad practice. If a considerable amount of literature already exists on a topic, selective case studies can be used to focus in on particular aspects and provide a very rich and detailed account and thereby refine our knowledge (Burton, 2000). However, it can be exploratory if there is little existing research on the topic.

The analysis of collected data will be analysed by using the relevant theoretical framework, which have been written in literature review. In conjunction with that, the primary data from research field in Indonesia will be critically analysed together with the secondary data that have been collected before undertaking field research in Indonesia. Here, the epistemological reason for conducting the interview is drawn by assumption that knowledge and evidence are contextual, situational, and intellectual, and that is requires the researcher to take distinctive approach to getting at the aim of this research.

Local Context in Indonesia:

Concept of Cluster and Cluster Based Policy for Indonesia: A Lesson from Existing Literature

A cluster is a geographically proximate group of interconnected companies and association institution in particular field, linked by communalities and complementarities (Porter, 1998). Furthermore, Porter (1998) argues that geographic scope of cluster ranges from a region, a state, or even a single city nearby or neighbouring countries which also relates to the distance over which informational, transactional, incentives, and other efficiencies occur.

Thus, cluster encompass an array of linked industries and other entities important to competition which include suppliers of specialised inputs such as components, machinery, and services as well as providers of specialized infrastructure. Additionally, many clusters include governmental and other institutions (e.g., universities, think tanks, vocational training providers, standards-setting agencies, trade association) to facilitate specialized training, education, information, research, and technical support.

Clusters occur in many types of industries, in smaller fields, even in some local industries, such as restaurant, car dealers, or antique shops. They exist in large and small economies, in rural and urban areas, and at several geographic levels (e.g., nations, states, metropolitan, regions, and cities). Moreover, cluster arises in both advanced and developing economies, although cluster in advanced economies tend to be far more developed (Porter, 1998).

All clusters can improve their productivity including traditional cluster. Rather than recommending the exclusion of foreign firms, cluster theory calls for welcoming them (Porter, 2000). In this context is FDI (Foreign Direct Investment) which are located in Indonesia. FDI can enhance cluster externalities and productivity, and their activities in a nation or state contribute directly to local employment and investment. Rather than advocate blocking imports, cluster theory stresses the need for timely and steady

opening of the local market to imports that boost local efficiency, provide needed inputs, upgrade local demand conditions, and stimulate rivalry (Porter, 2000).

Accordingly, it is important for Indonesian government at multiple levels (central and regional level) to embrace the pursuit of competitive advantage and specialization whereby local differences and sources of uniqueness are united and turned into strengths.

Furthermore, cluster theory focuses on removing obstacles, relaxing constraints, and eliminating inefficiencies to productivity growth. The emphasis in cluster theory is not on market share but rather than on dynamic improvements. Cluster policy's underlying view of competition is positive sum in which productivity improvements and trade will expand the market and many locations can prosper if they become more productive and competitive.

In its traditional form, clustering refers to the process in which geographically proximate producers, suppliers, buyers and other actors develop and intensify collaboration with mutual beneficial. However, in its most advanced form, according to a widely accepted definition proposed by Porter (Porter, 2000), a cluster is a geographically proximate group of interconnected enterprises and associated institutions in a particular field, linked by commonality and complementary. Under this definition, a cluster may incorporate suppliers of inputs, or extend to regular buyer or exporter. It also includes the government institutions, business associations, and providers of business services and agencies that support clustered enterprises in particular fields as product development, technology, marketing information and production process improvement (Tambunan, 2005)

Porter (2000), however, believes that clusters are not unique; they are typical and therein lies a paradox: the enduring competitive advantages in global economy lie increasingly in local things-knowledge, relationships, motivation- that rivals cannot match. Therefore, clusters are a striking feature of virtually every national, regional, state and even metropolitan economy particularly in more economically advanced nations (Porter, 2000). However, competition in today's economy is far more dynamic. Thus, clusters can affect competitiveness within countries as well as across

national borders. There are many considerations to take into account in order to involve the role of other institutions for instance governments and universities which can contribute to competitive success to promote economic development.

Clusters have discreet charm of obscure of desire (Steiner, 1987). This charm lies on the statement that regional specialisation on interlinked activities of complementary firms in production and service sectors and their cooperation with public, semi-public, and private research and development institutions creates synergies, increases productivity, and leads to economic advantages. Therefore, regions should specialise and policy should create, develop, and support such clusters.

In recent times; hence, clusters have grown to be an object of aspiration for many regions. They may be based on different foundations as Pavitt (1987) explains in his argument on clusters. The obscurity of clusters stems from this multidimensionality: clusters are based on different economic dimensions, take different forms, are measured and quantified with relatively different methods and empirical approaches, and are legitimated by a range of theories and hypotheses. Additionally, they have also become a desired object of research: the still vague character of clusters poses problems of theoretically sound definition, of empirical measurement, of policy recommendation and evaluation. Therefore, the policy relevance of a cluster approach is addressed in this research along with the risks of regional specialisation.

Knowing and understanding clusters are the value to region only if that knowledge leads to actions that grow economies and raise standards of living. Unfortunately, there is no single recipe for less favoured regions to follow that will meet the needs of all clusters. But there is a menu of actions from which to choose. The choices regions make depend on many factors, including geography, stage of development, resource constraints, special societal needs, clusters priorities, market imperfections, and local preferences.

Moreover, Porter (2000) explains that firms, either small or large, within cluster are able to more clearly and rapidly perceive new buyer needs. By contrast, the isolated firm faces higher costs and steeper impediments to assembling insight as well as a

greater need to create knowledge in house (Audretsch and Feldman 1996; Harrison, Kelley, and Grant, 1996; Jaffe et.al. 1993).

The Triple Helix: A Complementary Model for Indonesia

The phenomenon of the triple helix system has been acknowledged widely in developed countries (Etzkowitz and Mello, 1994; Turpin et al.,1993; Shinn, 1997; Leydersdoff ,1997) as it has emerged from the needs of universities to work closely together with the industry (i.e. Double Helix) in order to develop the knowledge spillovers (Marshall, 1920) and to retain the sustainable development of the industry-university integration. Furthermore, it is necessary for government to support this synergy as it will play the role of policy maker providing the necessary tools to encourage local region. The tools could be based on innovative policy or on incentives for the university and industry to develop on their research and development activities.

However, the new triple helix paradigm has been recognised as a new concept for some developing countries. Although, they have been developing this kind of joint partnership in 1990s (Tambunan, 2005) but the progress has been considered to be relatively slow compared with similar partnerships in the US and some of the Western Europe countries (Leydesdorff, 1997).

Therefore, in order to understand the triple helix paradigm from the viewpoint of the developing country, it is necessary to understand the story from the developed countries including the risks and the pitfalls which have already occurred during the implementation stage. Then, it might be beneficial for developing countries to take these lessons as benchmarks in order to improve the existing triple helix embryo(s) that are arising in some of the developing countries.

In conjunction with triple helix model, Indonesian regional policy makers pursue cluster strategies with the aim of making their region more competitive and thereby

accomplish sustained economic growth. But when pursuing such policy, they should also be aware of the potential drawbacks that are associated with regional clusters.

A Glance of the Triple Helix

The triple helix model has been said to be positive synergy among the three different actors in knowledge spillovers. The model engages the university as the centre of excellent with its academic-based research and development activities, industry as the provider of the customer demand based on its commercial activities as well as research and development, and the government as a policy maker. The integration of these different actors lies at the heart of the triple helix system that ideally will increase knowledge spillovers in the region; thus, increasing the competitive advantage of economic development, either regional or national.

The triple helix system was introduced by Professor Henry Etzkowitz who studied the importance of joining these three different actors in the economic activities to improve the regional development continuously. The Triple helix provides the ideal way for a traditional university to develop into an entrepreneurial university.

Such as 'hands-on' strategy, however, requires a greater science and technology policy capacity on the part of the state, industry and academia, since the judgements of the level and type of intervention in particular areas become more critical (Etzkowitz et al., 2004). Therefore, the central issues are the synergy among the three different actors in societies reflecting different traditions of political economy, and different levels and types of economic development, including the macro and micro economics of each particular country.

In conjunction with cluster approach, The Triple Helix model has been chosen to complement the cluster strategy. The Triple Helix originated as a model of discontinuous innovation and it is defined as the ability to renew innovation systems across technological paradigms (Etzkowitz et al., 2004).

In developing country, universities increasingly need the ability to transfer existing knowledge to lower levels on the technology scale within their societies and also to provide inputs into the development of high-level technologies that have been done through training process complemented by consulting, incubation and transfer capabilities. Therefore, The Triple Helix system places the role of the academic sphere in relation to small and medium-sized enterprises to engage in joint networking with other supporting institutions.

Indonesia has been trying to engage all actors to start this bottom-up model of innovation, where university, industries (either SMEs or Large Industry) and government together support regional development and prosperity. The Triple Helix thesis is that this university-industries-government interaction is the key to improving the condition for innovation in a knowledge-based society where the university as a source of new knowledge and technology; industries are the locus of production; and the government as the source of contractual relations that guarantee stable interactions and exchange (Etzkowitz et al., 2004).

Nevertheless, this complementary concept is introduced in developed countries; thus, to make it as reasonable concept for developing countries such as Indonesia, it is necessary to construct a vigorous science and technology infrastructure linked to the productive structure of the society (Etzkowitz et al., 2004). Then the result can eventually be expected.

Clusters in Indonesia: Discourse from SMEs to Manufacturing Industry

The working definition of clusters in this research is “*a geographical concentration of related industries and institutions*”. In Indonesian, *sentra*, is similar concept, as it is defined as a geographical concentration of manufacturers in the same sector.

Even though, the clusters and *sentra* are not essentially identical, this research focuses on strengthening cluster building among industrial district in 6 chosen sample clusters representing each province in Java region. However, to get the understanding why

Indonesian government has expanded their intention to strengthen industrial cluster, it is necessary to understand the evolutionary process of cluster starting from SMEs.

Indonesian *sentra (s)* have been taking place since 1969-1970 by SMEs. In 1996, some 9.800 *sentra/clusters* were scattered over the country. Some of them are traditional industry in craft, furniture, food processing, refractory bricks, roof tiles, wearing apparel, iron, and steel basic products.

SMEs clusters can be found in all provinces and most of them are located in rural areas. The clusters were established naturally as traditional activities of local communities whose production of specific products have long been proceeding and the workers have special skills in making such products (Tambunan, 2005). Clusters of batik, the traditional Indonesian textile, within the District of Java Island (i.e. Yogyakarta, Pekalongan, Surakarta and Tasikmalaya) are one of the examples that have long been existence. In 2003 most of the SMEs have been concentrated in Java region with 69, 05% compared to Sumatera region with less than 12% and less than 1 % for Maluku and Papua in East region. In Borneo, SMEs concentrated less than 5%. Accordingly, due to these facts, Indonesian government must admit that there are imbalance distributions of economic development in each region.

Additionally, Tambunan (2005) describes the importance of clustering not only for the development of SMEs in the cluster, but also for the development of villages/towns in Indonesia. He gave the example of how the clustering of rattan furniture producers has absorbed an entire village in Tegal Wangi, West Java and created several small-scale industrial activities in neighbouring hamlets. Similar evidence from wood furniture in Jepara, Central Java when the grow of this cluster in 1980s had transformed the town into a thriving commercial centre with many furniture showrooms and factories, modern hotels, new commercial banks, supermarkets, and European restaurants. Therefore, clustering is indeed important for the development of SMEs as well as for the regions, social and economic development.

Nevertheless, it has been found that not all the clusters within District of Java Island are successful. Some of them have found it difficult to thrive because of market

competition particularly those enterprises which have been established in rural areas. Therefore, it is urgent for government and university to reach these rural clusters in order to get involved in building up a cluster approach.

Cluster (in SMEs context) in Indonesia can be classified into four types, according to their level of development. The data from Central Bureau of Statistics explain that the first type is *artisanal*, indicating that the process of clustering is still at an 'infant' stage.

The second type is *active*; indicating that it has developed rapidly in terms of skill improvement, technological upgrading, and successful penetration of domestic and export markets. Examples of this cluster are roof tiles clusters, metal casting clusters, shuttle-cock clusters and shoe clusters.

The third type is *dynamic*, indicating the decisive role of leading/pioneering firms, usually larger and faster growing firms, to manage a large and differentiated set of relationships between firms and institutions within and outside the clusters. Examples of this type are clove cigarette clusters in Kudus, tea-processing in Slawi, and tourism clusters in Bali. In the case of clove cigarette clusters, their products are able to outperform products from Phillip Morris and BAT. Tea-processing clusters led by big companies such as Sosro have grown to become market leaders in the Indonesian soft drink market, leaving giant Coca-Cola behind (Tambunan, 2005).

Clusters of the fourth type are more advanced, more developed and more complex than the previous types. However, there are two of the well-known cluster agglomerations in Indonesia. The first is in Yogyakarta - Solo area with its tourism, furniture and interior decoration, metal processing, textile and leather goods, which all mutually benefit each other. The second one is Bali, known as a tourist destination with SMEs which produce traditional handicraft, furniture and interior goods, silver jewellery, and paintings

According to JICA (2004, p.6) the majority of commodities manufactured in Indonesian SMEs clusters are homogenous and dominated by final consumption goods. Quality and delivery are almost secondary because the market outlet is an intermediary and not directly linked to buyers.

From the policy perspective, in the 1980s and 1990s, Indonesian government emphasized special measure to assist SMEs to become viable, providing SMEs with a range of incentives and concessions (e.g. free access to business service and mandated targets to commercial banks to the SME sector). Thus, the increased efforts to support SMEs have resulted in significant coordination problems, as a large number of public agencies were concerned with SMEs but few systems were in place to coordinate efforts (JICA, 2004, p.7)

The government action for SMEs clusters development dates back to the BIPIK (Guidance and Development of Small Industries) programme 1974 initiated by the Indonesian Ministry of Industry with the aim of forming small enterprises into *sentra*. In the 1980s, the government adopted a policy called KOPINKRA (Indonesian Industrial Cooperative) organizing *sentra* SMEs into cooperatives.

The year 2000 was turning point in changing SMEs policy. PROPENAS (National Development Plan) spotlighted strengthening SMEs clusters based on the following agenda:

1. Create a conducive climate for business environment
2. Access to productive resources
3. Develop entrepreneurship and competitive SMEs clusters

The Mid-term Action Plan (MTAP) was subsequently proposed, emphasizing the strategic role of the SMEs sector in the national economy. However, MTAP presents few strategies for cluster strengthening.

The recent efforts in SMEs and cluster promotion are directed towards the following:

1. Decentralization

The economic Forum in Central Java initiated a cluster development programme in line with the decentralization policy. The forum is sort of experimental assisted by BAPPENAS (Indonesian National Development Planning Agency) and GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit), with major focus on capacity building of local resources.

2. Demand-Oriented

Indonesian Ministry of Trade and Industry along with ADB (Asian Development Bank) technical assistance, is currently executing a study on Business Development Service in Central Java and South Sulawesi.

3. Public-Private Partnership

Private initiative is encouraged for SMEs and cluster development; however some public support is still required during the transition period.

SMEs clusters have been playing essential part in Indonesian economic development. Therefore, further to the cluster approach, Indonesian government has initiative to implement the similar approach for manufacturing Industry which also playing crucial part in Indonesian economy, mainly driven by FDI (Foreign Driven Investment) factor.

Strengthening Cluster building in Java Region - Moving on to Industrial Cluster: Theoretical Concept

Clustering refers to the process in which geographically proximate producers, suppliers, buyers, and other related agencies intensify collaboration with mutually beneficial effects.

In keeping with JICA (2004, p. 19), the most inner circle in figure 1 below represents the majority of clusters in Indonesia, both, SMEs and Industrial ones. The status quo of their inner circle can be explained in that the degree of inter-firm specialization and linkages with outside stakeholders is low or almost non-existent, reflecting a lack of specialist and a weak socialization. And it can be seen, that the strengthening cluster building has involved some actors that represented in the Triple Helix Theory.

In relation to the local context in Indonesia, there is relationship between industry and SMEs in terms of inter-firm linkages and sub-contracting relations. Inter-firm linkages where the mix of competition and co-operation, agglomeration externalities,

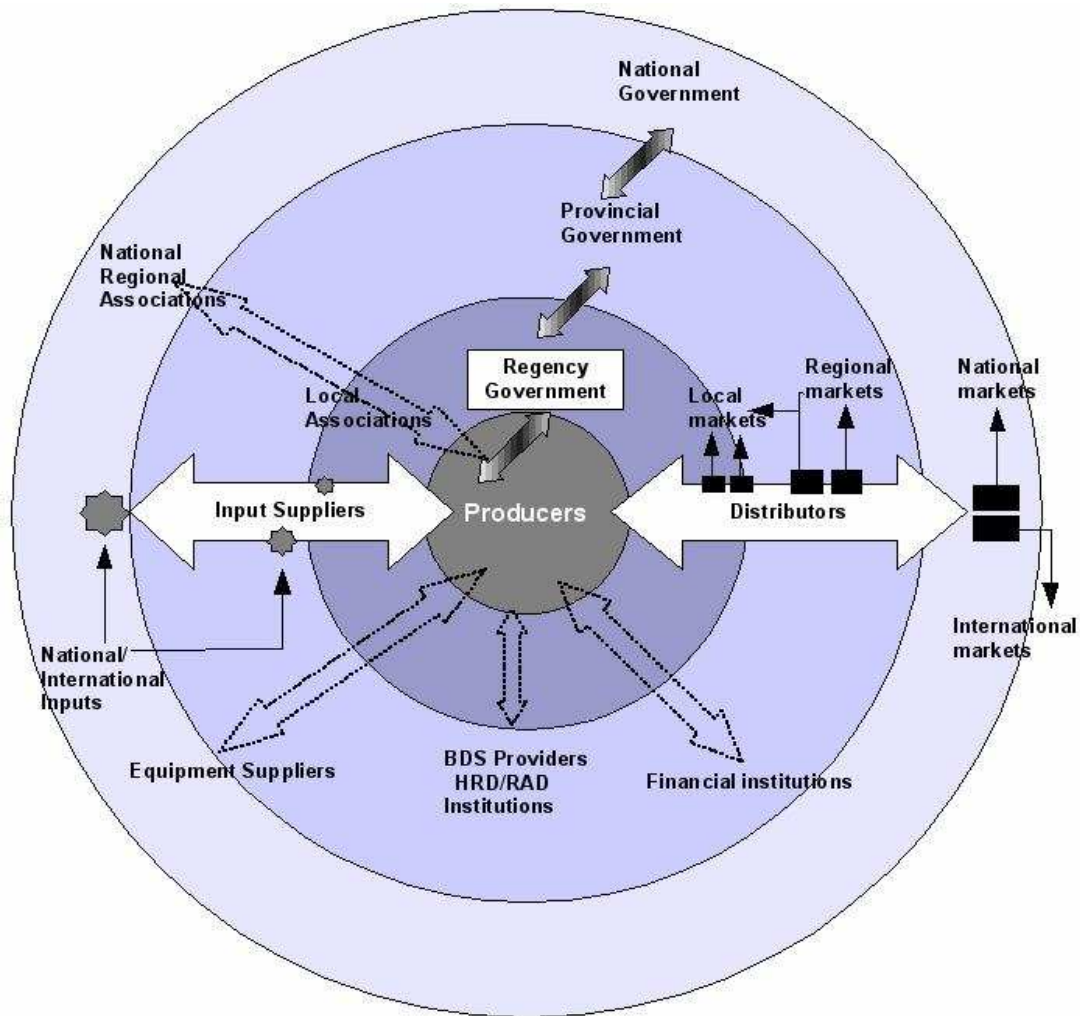
and knowledge spillovers among firms within a cluster are the key factors underpinning the growth and formation of clusters (Harrison, 1992; Nadvi & Schmitz, 1994). Along with the growing industrial sector, the functional complementary between Industry and SMEs is increasingly established and translated into inter-firm linkages.

Strengthening SMEs clusters makes the leading clusters SMEs grow as engines in the manufacturing industry as there is a subcontracting activity within those cluster. In this sense, cluster strengthening should contribute to acceleration of industrial development. Along with the SMEs, the recent decentralization policy, since 1 January 2001, has raised a growing interest in industrial cluster strengthening in the context of regional and community development. Therefore, the government at the central level are primarily responsible for policy issues. Particularly, Indonesian Ministry of industry and Trade will concentrate on dissemination of its policies (e.g. commodity development and enhancement of SMEs entrepreneurship along with Industry in Industrial districts) to regional stakeholders.

On the other hands, the role of local government along with the decentralization policy, thus, local governments (province and regency) are primarily responsible for open information system and coordination with other public supporting institutions.

Figure 1 Cluster Continuum¹

¹ Policy discussion Paper No. 8, 2001, “ Best Practice in Developing Country Industry Clusters and Business Networks, ADB TA papers



The cluster strengthening in this context is justified for the following reasons:

1. Manufacturing district in Java is concentrated in clusters. Cluster strengthening would be a driving force to regional development,
2. Cluster strengthening would strengthen community networking and trust building in a cluster,
3. Cluster strengthening will contribute to balanced regional development, decreasing resource concentration in urban areas,
4. Both economic prosperity and social responsibility will be attainable through industrial cluster strengthening

Furthermore, Indonesian government believe through the cluster strengthening process, a principle of "3C" (Competition, Cooperation, and Concentration) shall be

applied. Further roles and responsibilities of Actors for Capacity Strengthening can be seen in Table 1: Appendix.

Competition

1. A linkage to the dynamic markets is a requisite for Industrial clusters to shift away from price-competition to more competitive design and technical innovation
2. Take-off from a pre-information society is of vital importance for Industrial clusters to gain a competitive edge

Cooperation

1. A flexible form of cooperation will be promoted to further activate Industrial clusters
2. Adhere to a bottom-up approach is a prerequisite to consolidate the social capital
3. A Public-Academic-Private partnership which is illustrated in Triple Helix model is a basic form of cooperation required for capacity strengthening of Industrial clusters. Yet, public support is to be extended based on demand-driven delivery

Concentration

1. Targets should be concentrated on potentially viable Industrial cluster, which have ability, willingness, and passion to step forward
2. Cluster strengthening shall be promoted by focusing on collective activities by commonalities
3. Export oriented clusters and those clusters producing the target products, supported by a commodity development plan by Indonesian Ministry of Industry and Trade should be targeted in light of creating competitiveness of the nation

Six Chosen Industrial Clusters in Java

According to Kuncoro (2001), main industrial areas in Indonesia have been located overwhelmingly in Java. Most of Indonesian modern manufacturing establishments have continued to be predominantly located on Java and to a much lesser extent, Sumatra Island during 1976-1999.

Indonesia has 33 provinces, three of which have special status, and another is the special capital region. Each province has its own political legislature and is headed by a governor. The provinces are subdivided into regencies and cities, which are further subdivided into sub districts, and again into village groupings. Following the implementation of regional autonomy measures in 2001, the 440 districts or regencies have become the key administrative units responsible for providing most government services. The village administration level is influential handling matters of a village or neighbourhood by an elected *lurah* or *kepala desa* (village chief).

Furthermore, Java with more than half inhabitants offers a huge potential markets and is importance by its own rights. Another economic aspect is investment. Most of investments, either FDI or domestic, have been concentrating in Java. Accordingly, to understand the development of cluster policy for industrial sector, the six industrial clusters have been chosen.

The six chosen Industrial Clusters in this research will be explained as follows

1. Gresik Industrial District in East Java

It is located in East Java with 1 Ha infrastructure areas and 91 Ha commercial areas. Gresik Industrial district limits the industries that are allowed to operate in its areas. Gresik welcomes manufacturing industry both for FDI and Local Investment.

Here are the criteria of industries that can operate in Gresik:

CHEMICAL INDUSTRY: Layer material (coating), Cosmetic, Rubber processing

METAL INDUSTRY: Electronic, Electrical, Machine and Spare part, House ware and Kitchen ware

VARIOUS INDUSTRIES: Printing, Wood and rattan processing, Furniture, textile, Garment, Cold Storage

For further map and Gresik Development can be seen in Appendix 2.

2. Tugu Wijaya Semarang in Central Java

It is located in Central Java which covers 250 Ha of land; the 200 Ha of land is prepared for the industrial lot. The rest of the land is used for infrastructures, such as social facilities and environmental facilities. The area is prepared phase by phase. Phase I covers 20 Ha was established in 1996, the next phase of 20 Ha on 1997 and continued until the year 2000.

The criteria of industries that can operate in Tugu Wijaya Semarang are under investigation. For further map can be seen in Appendix 3.

3. Sentul Bogor in West Java

It is located in West Java only 60 minutes from Soekarno-Hatta International Airport and approximately 50 kilometres to Tanjung Priuk International Harbour by toll road. Sentul is centrally located to among major commercial cities: Jakarta, Bogor, Bandung.

Sentul has various tenants both from FDI and Local investment. They operate in various industries as follows: Chemical, House Ware and Kitchen ware, Automotive spare parts, Garment, Food Industry, Pipe Manufacturing. Further map and location can be seen in Appendix 4.

4. Jababeka in Bekasi

The Jababeka is the first modern Indonesian eco-industrial estate to be jointly developed with ProLH GTZ under a technical cooperation program collaboratively established by Indonesia's Ministry of Environment and the

Republic of Germany. It spans 1,570 hectares and contains more than 1000 local and multinational corporations from 23 countries, such as USA, Japan, China, France, UK, The Netherlands, Australia, Korea, Singapore, Taiwan, Malaysia, and numerous others (Jababeka, 2006).

The estate offers a comprehensive one-stop industrial development solution that is beneficial for virtually any type of enterprise. These include industrial land and built-to-suit factory buildings, to name a few. Our aesthetically designed factories with their wide range of use make these units the choice for entrepreneurs and big companies alike. Also included are factory facilities such as standard factory building (SFB), three-in-one building (TOB), supporting industrial building (SOB), modern warehouse and customized industrial building (CIB). All buildings offer maximum flexibility and maximum area utilization. For further map and location, see appendix 5

5. Kujang Industrial

It is located in Kujang-West Java, which spans 140Ha with 15 of existing companies. Kujang is also main choice as Industrial District in West Java due to the following considerations: located at the cross road between Jakarta-Cirebon highways, connected with Toll Road to Jakarta, Tanjung Priuk International Harbour and Soekarno-Hatta airport, availability of skilled labour, availability of housing complex nearby the Industrial area. The existing manufacturing industries are mainly chemical industry, both from FDI and Local investment. For further details regarding the map and location can be seen in Appendix 6.

6. Kawasan Berikat Nusantara in Jakarta

Located in the capital city of Indonesia, Jakarta, Kawasan Berikat Nusantara has been divided into three sub areas: Cakung, Marunda, and Priok. Each of them has FDI and local investment mainly for Garment, Chemical, and Electronic. Further map and location can be seen in Appendix 7.

Conclusion

Understanding of the cluster phenomenon in Indonesia has been so blurred by political, ideological, and business biases that any serious study must start from a careful empirical analysis, of how these clusters in Java are created and developed, and of the factors that account for their differential success, according to a set of criteria that must be established at the start.

Nevertheless, the study of clusters, particularly Indonesian industrial cluster could lead us to the conclusion that we should not be constrained by the boundaries artificially set by the promoters of the cluster: international organization/consultant based in Indonesia, developer, and other relevant actors. In other words, we must go back to seek the historic sources of inspiration of the cluster strategy for Indonesia.

It is significant to look into the formation and operation of those SMEs cluster inspired industrial complexes that changed the dynamics of world competition: from SMEs cluster to Industrial cluster, mainly driven by FDI, a common phenomenon in the South East Asia Region.

Developing such Industrial cluster in Java has now become critical issue for economic development regarding the importance of Java itself as the centre region in Indonesia and as a matter of political and social consequences. And therefore, the process of industrial cluster has mixed simultaneously with the regional industrial strategy, state policies, and the new economic geography.

In addition, every effort to investigate the interaction between technological development, industrialization, and regional development on the basis of international experience should start with a comprehensible distinction among the various kinds of realities to which terms like cluster or any other labels, refer. This is not just a semantic matter, seeing as each type of cluster must be analyzed and evaluated according to the implicit or explicit aims it is trying to achieve, as well as the local context where those clusters currently exist.

The story of six industrial clusters in Java is rarely in scholarly research, with some notable exceptions. For this reason, it is still useful to recount the facts in historical sequence, in order to be able to comprehend both the area's uniqueness and its potential for generalization.

In view of that, understanding the dynamics of SME clusters will complement the study of industrial clusters in Indonesia. Therefore, it is valuable to summarize the development of cluster in Indonesia, starting from SMEs cluster, as a major influence towards the industrial cluster:

1. The historical precedents of SMEs cluster in Indonesia from the 1970s
2. The concept of cluster for Indonesian context: a discourse from different perspectives
3. The creation of SMEs cluster in Indonesia and the supported policy from government
4. The growing phenomenon of industrial districts in Java region, mainly driven by FDI (Foreign Direct Investment) as well as local investor
5. The creation of industrial cluster along with the SMEs cluster
6. The growing domination of three actors: university, business/industry, and government in developing industrial cluster in Java

This historical sequence is crucial to understanding Indonesian Industrial Cluster in Java. For the factors and actors are generally associated with its growth and success have all been important elements at different periods and with different intensities in each period – a fact that makes all the difference in the world for the purpose of analysis and generalization.

In conjunction with local context in Indonesia, in spite of its lack of previous industrial basis, the area did have a significant research tradition in SMEs going back to the 1970s. But the crucial link between the early stage of SMEs cluster and Industrial cluster was the different role of actors involved. For industrial cluster case, Indonesian government must involve the developer, university, and industry at any stages of cluster development.

Studying clusters and their dynamics will help the Indonesian Government to progress the current policy. Influenced that there is a need to link University and Industry, the development of cluster in Java should be complemented by Triple Helix model.

In developing country, universities increasingly need the ability to transfer existing knowledge to lower levels on the technology scale within their societies and also to provide inputs into the development of high-level technologies that have been done through training process complemented by consulting, incubation and transfer capabilities. Therefore, the triple helix system places the role of the academic sphere in relation to small and medium-sized enterprises to engage in joint networking with other supporting institutions.

The Triple Helix and cluster approach have been regarded as suitable and practicable approaches for Indonesia where the industrial clusters are spread and located in diverse areas. Therefore, it will be effective and efficient for universities and other institutions if they want to engage and develop these clusters by providing technical assistance or service. In conjunction with the cluster approach, the triple helix concept is a complementary thesis in supporting this programme. Implementation of the Triple helix requires active role from university, industry and government to support each other in order to enhance economic and social development in Indonesia.

Strengthening cluster and Triple Helix approach for Java case studies is not a trouble-free and short programme as it will involve many actors from different backgrounds. It must be taken into account that a joint programme should be of value for all actors involved, based on consensus among them, all entities should support each other in order to achieve economic and social development

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