

Innovation Policies for Asian SMEs: An Innovation System Perspective

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1. Introduction

Among policy-makers and academics consensus suggests that innovation is a crucial factor in generating economic growth and development in the developed world (Lundvall 1992, Von Hippel 1988). Traditionally, the importance of innovations is ascribed to the new competitive landscape stemming from increased economic globalization, new types of regulation of international trade (Amin 2004), improved ICT-technologies and lower prices on transportation (Fröbel et al 1980). In this structural explanation firms in the developed world are forced to innovate to maintain their competitiveness since firms located in developing countries can catch-up by applying imitation-based strategies and produce almost identical products to those manufactured in the developed world at a cheaper price (Asheim and Vang, forthcoming). Since firms in developing countries have been conceptualized as

imitators it is not surprising that the importance of innovation for developing countries has only recently begun to be acknowledged.

Traditionally, growth, catching up and development in less industrialized countries has been considered a matter of exploiting their comparative advantage in terms of low factor costs (especially labor costs). We do not wish to debate the reasons for focusing on countries' comparative advantages. However, we argue that the models still suffer on several accounts. They tend to assume a mechanistic process which ignores the importance of firm's innovative practices in the process of upgrading in the value chain, the particularities of firms in developing countries and how the (lack of) systemic features in the institutional support system affects these innovative practices. Thus the increasing interest of the governments in the Asian countries on innovation policies should be welcome. But before uncritically embracing these initiatives some considerations need to be taking into account.

Among policy-makers and academics, consensus suggests that innovation is a crucial factor in generating economic growth and development in the developed world (Lundvall, 1992; Von Hippel, 1988). Traditionally, the importance of innovations is ascribed to the new competitive landscape stemming from increased economic globalization, new types of regulation of international trade (Amin, 2004), improved ICT-technologies, and lower prices on transportation (Fröbel et al., 1980). In this structural explanation, firms in the developed world are forced to innovate to maintain their competitiveness, since firms located in developing countries can catch-up by applying imitation-based strategies, and produce almost identical products to those manufactured in the developed world at a cheaper price (Asheim and Vang, forthcoming; see also the experience of Taiwan in Chapter 16 of this volume)). Since firms in developing countries have been conceptualized as imitators it is not surprising that the importance of innovation for developing countries has only recently begun to be acknowledged.

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costs (especially, labour costs). We do not wish to debate the reasons for focusing on countries' comparative advantages. However, we argue that the models still suffer on several accounts. They tend to assume a mechanistic process that ignores the importance of firm's innovative practices in the process of upgrading in the value chain, the particularities of firms in developing countries, and how the (lack of) systemic features in the institutional support system affects these innovative practices. Thus, the increasing interest among governments in the Asian countries in innovation policies should be welcome. But before uncritically embracing these initiatives, some considerations need to be taking into account.

The problem is that in developing countries, the general trend has been to follow the innovation policies of the developed world that, we will argue, might not be the most appropriate thing to do. In the developed world, innovation policy has been largely dominated by technology policy (Lundvall and Borrás, 2004), initially as a consequence of the so-called linear model of innovation that place R&D in the centre of the innovation process, and primarily focus on (radical) product innovations. Following this model, governments have supported mainly fast growing and large firms in technology intensive industries, such as information and communication technologies (ict), biotechnology or nanotechnologies that showed rapid growth and high value added. Copying the innovation policy of the developed countries, many governments in the South also decided to implement large-scale programs on high tech industries dominated by large firms.¹

However, most economic activity in developing countries remains outside these high-tech industries, and is based on small and medium sized firms (SMEs).² For example, in Indonesia, Taiwan, India, and Thailand, between 90 and 98% of the establishments are SMEs, and employ between 70-80% of the workforce. Clarysse and Uytterhaegen (1999) estimate that only 3% of the SMEs are in high tech industries and receive the attention of policy makers.³ If the government wants to support innovation in other industries, a set of complementary policies is needed to target the main economic actors (SMEs) and most important industries (usually traditional and natural-resource based) in the economy. The point of departure for this chapter is that in developing countries, SMEs are responsible for the largest part of employment and a significant share of value added. And that innovation policy supporting the particularities of SMEs has been widely ignored; occasionally, SMEs have even been discriminated against.

This chapter aims at shedding some light on the immensely complicated issue of innovation policy for SMEs in developing countries, or, more specifically, Asian SMEs. In other words, one can say that the purpose of this chapter is to discuss the type of innovation

policy needed to reach the 65% potential innovators that have been ignored by current policies (Clarysse and Uytterhaegen, 1999). Historical examples can also illustrate why the Asian SMEs should be targeted. The Asian SMEs have played a vital role in the development of the tiger economies in East Asia (Hong Kong and Taiwan) and their younger siblings in South East Asia (Malaysia, Thailand), and are among the most important sources of employment in the rest of Asia. Hence, there are good reasons to look into the type of innovation policy that is needed to facilitate their growth and competitiveness. As the Asian innovation systems are primarily developed around supporting large firms or high tech firms, there is also an urgent need to pay attention to redesigning the innovation systems to integrate the SMEs. Since these issues are, as said, immensely complicated and call for both theoretical and empirical novelty, the chapter will be explorative in nature, and cannot do full justice to the diversity of conditions shaping the innovation-based competitiveness of Asian SMEs.

Asian SMEs have traditionally tended to concentrate spatially with other SMEs operating in the same industry. This is especially clear in traditional industries and resources based industries in Asian countries. The regional dimension is crucial, as Asian SMEs tend to be more dependent on regional conditions and regional support. This can partly be attributed to the fragmentation and the transitional character of the national innovation system in many Asian countries (Lundvall et al., forthcoming).

The chapter applies the so-called regional innovation systems (RIS) approach (cf. Chapter 16 in this volume). Regional innovation systems can be seen as a “constellation of industrial clusters surrounded by innovation supporting organizations” (Asheim and Coenen 2005: **page number??**). In this sense, industrial clusters represent the production system/part of the regional innovation system. In the RIS approach, industrial clusters are defined as the geographic concentration of firms in the same or related industries (Porter, 1998; Pietrobelli and Rabelotti, 2004; for a critique, see Martin and Sunley, 2003). In well-functioning clusters, proximity facilitates the knowledge and information circulation needed in the particular industry in a particular context. The recent adaptation of the RIS approach to the Asian context will be used as a departure point in the discussion (see also Asheim and Vang, forthcoming).

In the context of RIS, two important aspects need to be highlighted. Contrary to more traditional approaches to innovation and upgrading, a RIS approach stresses that supporting SMEs in their innovation-oriented upgrading process is a matter of not only facilitating the access to technology, but also providing what we later refer to as soft infrastructure (increase qualification of the human resources, facilitate organizational change, support social capital).

In contrast to other approaches stressing these variables, the RIS approach puts the emphasis on the systemic dimension. Most small firms will not be able to handle this process alone. They rely on interactive arrangements of horizontal or vertical character that assures the appropriate information and knowledge transfer. Arrangements such as subcontracting, clustering, or collective support systems underpin the needed information and knowledge circulation (Berry et al., 2002).⁴ Furthermore, collective arrangements facilitate the access to the resources needed in the innovation process (qualified human capital, technology, financial capital, etc).

In this chapter, we analyze four clusters of SMEs that have been especially successful in entering the global market. Special attention is paid to the so-called soft infrastructure, the industry specific needs for cluster (e.g. interaction), and RIS dynamics/policies (e.g. needs for devolution; industry specific needs for building knowledge creating institutions). By applying Pietrobelli and Rabelotti's (2004) SMEs typology of specialized suppliers, complex production systems, resource-based industries, and traditional manufacturing industries, we strive towards providing some degree of totality of (relevant) industries; this typology adapts Pavitt's (1984) typology to developing countries. One case per industry is included. More specifically, Bangalore's Software industry is presented as an example on specialized suppliers. The Thai automobile industry's clusters are examples of a complex production system. Taiwan's orchid industry as a case of a resource-based industry, and the Jepara furniture cluster in Indonesia, illustrates a traditional manufacturing industry.

The rest of the chapter is structured as follows. After introducing stylized facts on SMEs' innovative performance, attention is turned to the theoretical framework. Taking into account the localized nature of SMEs' economic activity, our level of analysis is at the regional system of innovation (RIS). We provide a general introduction, contextualize this to the Asian situation, and introduce the industry differences on the basis of Pietrobelli and Rabelotti's (2004) typology. We then turn to the empirical section, where special attention is paid to the four cases. Finally, we draw some general conclusions on innovation policies and the need for restructuring the Asian innovation systems.

Regional innovation systems and SMEs

This section introduces the concept of regional innovation systems (RIS), and contextualizes it to the Asian context. In innovation systems research, innovation is the result of an interactive learning process (Lundvall, 1992). The RIS approach stresses the regional clusters that are crucial for Asian SMEs. Their interaction – at best – often takes place at the local level, with firms and other institutions located in the same geographical area. The

extensive literature on regional innovation systems and clusters has long acknowledged the role of regional embedded networks in the innovation process of SMEs (Asheim et al., 2003; Cooke and Morgan, 1998; Cooke and Will, 1999; Schmitz, 1992), and in developing countries (Albu, 1997; Bitran, 2004; Giuliani, 2004; Pietrobelli and Rabellotti, 2004; UNIDO, 1997 and 2004; Giuliani and Bell, 2005). Moreover, this literature explicitly finds that mostly SMEs external relations are more confined to the region than those of large firms (Cooke and Morgan, 1998; Asheim et al., 2003). One of the reasons for this is that SMEs are more dependent on tacit knowledge and less capable of searching for and using codified knowledge. This forces them to rely more on personal ways of transferring (tacit) knowledge and on learning-by-doing and interacting.

According to Cooke and Morgan (1998), a RIS is defined as a system in which firms and other organizations are systematically engaged in interactive learning through an institutional milieu, characterized by embeddedness. The crux of this definition lies in the notion of embeddedness. This refers to the importance of personal relations and networks ingrained in local social and cultural institutions (Granovetter, 1985). Without it, the definition would equal the definition of a national innovation system written small. Additionally, a regional innovation system can be conceptualized as regional industrial clusters surrounded by supporting knowledge organizations (Asheim and Isaksen, 2002). This is the definition used in this chapter. Thereby, the regional innovation system is boiled down to two main types of actors and the interactions between them. The first type of actors concerns the companies in a region's main industrial clusters, as well as their support industries (e.g. customers and suppliers). The second type of actors, backing up the innovative performance of the first type of actors, includes research and higher education institutes (universities, technical colleges, and R&D institutes), technology transfer agencies, vocational training organizations, business associations, finance institutions, etc. These knowledge creating and diffusing organizations hold important competence, train labour, provide necessary finance, and so on to support regional innovativeness.

The notion of a well-functioning RIS involves a strategic institutionalization of innovation between the private and the public sectors in a systemic way, constituting an institutional infrastructure as a "superstructure" to the production structure of a region. The systemic dimension of a RIS derives in part from this partner-based character, associated with innovation in networks. While, as Lundvall (1992) puts it, an innovation system is a set of relationships between entities or nodal points involved in innovation, it is really much more than this. Such relationships, to be systemic, must involve some degree of inter-dependence;

not all relationships may be equally strong all of the time, but some may be. Stressing interdependency is crucial in a developmental context, where, as we have explained above, the development model to a large extent is based on indigenous – at least in initial phases – capital and knowledge sources. The challenge is thus for most clusters in developing countries to attract TNCs and other capital influxes, and gradually develop a situation of interdependency between the TNC and the local/regional small firms, as well as between the TNCs and the institutional support system that is beneficial for both the TNC and the regional cluster of indigenous SMEs.

A developed and continuously developing absorptive capacity is a prerequisite for firms and regions to engage efficiently in interactive learning (Cohen and Levinthal, 1990; Zahra and George, 2002). Absorptive capacity, as conceptualized in this chapter, is considered as a dynamic capability that allows firms and/or regions to take advantage of knowledge and information in their environment, process it, and commercialize it. Subsequently, organizations change takes place to allow these firms to take advantages of the new information. We suggest that:

- (1) A firm's absorptive capacity is a function of its prior internal knowledge – being tacit or codified – and the institutional setting, referring to, among other aspects, how social capital allows for knowledge to circulate and how public institutions serve this knowledge circulation.
- (2) A region has an absorptive capacity that is a function of individual firms' absorptive capacity, human capital (formal and tacit), social capital, and financial capital). Hence, we oppose seeing regional absorptive capacity as simply an aggregate of the individual firms' absorptive capacity. Absorptive capacity building is about investing in training human capital and engaging in collaboration between firms and universities.

SMEs' potential to benefit from this regional or local system of innovation is more limited than large firms and, at the same time, they depend much more than large firms for the conditions of the RIS. Large firms usually have the resources to access the required technology, hire qualified human resources by their own, or introduce new managerial techniques. SMEs, especially in developing countries, on the other hand, usually need to engage in collective actions to share the costs of the acquisition of machinery that will be used by all, access financial resources, as they will not be able to do it on their own. These collective actions usually take place between producers localized in a certain area, and, in some cases, are based on existing long social relationships or social capital. These are built on trust and through the initiative of more qualified entrepreneurs, or the support of the

government. Thus, SMEs are much more dependent on the local conditions, and the role of the RIS for clusters of SMEs in developing countries is crucial.

Since the acquisition and transformation of knowledge required for innovation and the learning processes differ significantly across industries (Pavitt, 1984; Asheim et al., 2003; Asheim and Gertler, 2004; Tunzelmann and Acha, 2004), we emphasize that the interaction and need for institutions providing knowledge support for SMEs in a RIS has also to account for industrial differences. One can differentiate between four categories of clustered Asian SMEs: traditional manufacturing, resource-based industries, complex product systems, and specialized suppliers. Some of the clustered SMEs rely on indigenous capabilities, while others have to rely on exogenous sources, especially TNCs and – to a minor extent – members of transnational communities. The impact of the large firms on indigenous SMEs varies significantly across industries. Sometimes, SMEs establish a cooperative agreement with large firms, in which both groups are on even terms and share the technology, infrastructure, capital, or knowledge available to the firms in the cluster. In other instances, SMEs are acting only as subcontractors of large firms, and the transfer of knowledge can be very limited. The role of large firms in a local cluster will be discussed and illustrated in the cases described later in this chapter. Table 19.1 summarizes the main characteristics of each cluster.

[Table 19.1 here]

Traditional manufacturing and natural resources-based industries are the most common in most Asian countries (Dhungana, 2003). Food and beverages and textiles are the most important industries, in terms of employment and value added in manufacturing, at least in India, Indonesia, Philippines, China, Sri Lanka, and Thailand. With regard to the resource-based clusters in Asia, one can find convincing examples of upgrading of resource based clusters and their insertion in the global value chains.⁵ The upgrading in this type of industries is dependent on the development and acquisition of scientific knowledge, and its application to both product and processes. The linkages with basic and applied research institutions are crucial in the innovation of these industries. SMEs in complex product systems (CoPS) are highly specialized firms, anchored to a large assembler that operates as the leading firm. Innovation in the network of CoPS is highly dependent on the strategy and the directions of the assembler. Specialized suppliers (e.g. in software) are very important in the most advanced countries in Asia (India, Singapore, South Korea), and are less relevant for the less developed countries.

RIS and clusters of SMEs in Asian countries

The aim of this section is to apply the RIS framework to the Asian countries, in a way that highlights how systemic propensities differ across industries. In this section, we point to the stylized facts of constraints to economic development in Asian countries from a RIS perspective. The limited space in this chapter prevents us from paying too much attention to the different degrees of industrialization and development in the Asian countries. In accordance with most studies in development research, the RIS perspective stresses the importance of physical capital (hard infrastructure), social capital (soft infrastructure), human capital (education and training), and financial capital (Asheim and Vang, forthcoming). What the RIS perspective adds to this is the systemic propensities and an emphasis on interactive aspects in a territorial and industrial context. The hard infrastructure is considered more as a contingency than an actual part of the more theoretical aspects. Thus, it will only be treated in this manner. Most attention will be paid to the latter aspects (e.g. soft infrastructure). The importance of the different factors and the degree of interaction varies according to the dominating industrial activity in the region in question, and, naturally, the already existing endowment of particular factors.⁶ The discussion of each of the components of the RIS will be particularized to the four types of industries described above.

Human capital (soft infrastructure) in the Asian context

Human capital refers to “the skills, education, health, and training of individuals” (Becker, 1998: 1). It is considered a corner stone in development (Romer, 1990). One of the most important drawbacks of developing countries is the poor supply of qualified general and, subsequently, industry-specific human capital. As a proxy for the lack of general human capital, one can use illiteracy rates. And adult illiteracy still reaches the two digits in some Asian countries, such as Indonesia and Malaysia (World Bank, 2003). Enrolment in secondary education is around 50 per cent⁷, while most of the developed world reaches 90-100 per cent. With the exception of some countries like South Korea, the enrolment in tertiary education is between 10-20 per cent. SMEs need to use human resources more intensively than large firms in their innovation process (Kaufmann and Tödting, 2002).

As a consequence of the poorly developed educational system, SMEs in Asian countries have to rely on employing a significant portion of poor and low-skill workforce (Das, 2003), and rely much more on learning by doing, as opposed to formal training. The lack of qualification among the employees constrains the firms’ absorptive capacity, i.e. the ability to utilize available information, and the information and knowledge that comes from interaction with users. Competencies, when it comes to incremental improvement, reorganization of production processes, or cultivating craftsmanship knowledge, are highly

limited. This means that firms have a limited prior knowledge of modern production, thus only limited absorptive capacity. In SMEs, almost all decisions are taken by the owners or the managing directors (Oyelaran-Oyeyinka and Lal, 2004). This implies that decisions made by small firms are highly influenced by the qualifications and skills of the manager directors.

The lack of qualified human resources, the poor managerial skills of the manager, and the difficulties accessing strategic information are considered to be the main obstacles to innovation in SMEs among Asian countries. The problems associated with the low qualification of human resources can be illustrated in the cases of the Jepara furniture cluster (Indonesia) and the Thai automotive cluster. In the Jepara cluster, as summarized in Table 19.2, knowledge creation is basically through apprenticeship and learning by doing in general. In the cluster, there are a limited number of highly skilled craftsmen, who are employed by joint ventures of SMEs or larger foreign firms (Sandee, 1998). Additionally, managerial and marketing skills are often lacking that seriously limits the absorptive capacity of the firm. In the Thai automotive industry, due to the lack of competition/incentives⁸ and lack of opportunities – because of the global strategies on which the assemblers relied, the Thai SMEs were not stimulated to invest in their human capital and technological upgrading, nor did their profit margins allow for huge investments in human capital building. The central Thai government did not develop or implement competitiveness oriented policies (the link to decentralization will be elaborated upon below). As a result, most Thai SMEs lack the human capital and organizational ability required to engage in innovation (and upgrading in the global value chain), that is, they lack the required absorptive capacity to acquire technology and knowledge generated elsewhere.

[Table 19.2 here]

However, not all Asian RIS lack the required qualified human capital. For example, Taiwanese SMEs have undergone a tremendous upgrading in formal competencies in the past years, and the level of education among the population is very high. This is facilitating the upgrading process of the flower industry in Taiwan. The upgrading strategy for this industry has been based on creating links with biotech laboratories. These biotech laboratories undertake research and development in new species of flowers. The high qualification of the producers of the flowers facilitates the linkages between the scientific infrastructure provided by the RIS and the productive infrastructure. In the Bangalore software industry, there is also enough supply of qualified human resources, as there are several universities, business

schools, and high schools located in the region that provide the cluster with the required supply of skill labour.

Yet, even when the RIS provides the necessary supply of human capital, SMEs will only benefit from qualified human capital, if the right organizational setting is in place. Investing in training is only one variable in the equation; if firms in the RIS do not have the ability to absorb skilled labour and use it to upgrade or move up in the value chain, all training efforts will be dismissed. In other words, the soft infrastructure of a RIS comprises both the provision of skilled human capital, and the absorptive capacity of the firms that in turn also depends on their employees and organizational issues. In sum, one of the key elements in the RIS in Asia is the provision of timely and qualified human capital to support the industries settled in the region. For Asian SMEs, being located in a “human capital rich region” is definitively an advantage, as the qualification of the human capital is one of their main constraints to innovation and growth. But in order to benefit from these local conditions, Asian SMEs need to develop their absorptive capacity, creating organizations that nurture innovation.

Social capital and networks (soft infrastructure) in the Asian context

Soft infrastructure varies significantly and is strongly dependent on the local culture, however heterogeneous and dynamics that might be measured in terms of value and subsequently behavioural regularities. Following the World Bank (1998: 8), “Social capital refers to the institutions, relationships, and norms that shape the quality and quantity of a society's social interactions... Social capital is not just the sum of the institutions which underpin a society – it is the glue that holds them together”. Social capital refers both to *structural* social capital and *cognitive* social capital (World Bank, 2002). Structural social capital refers to “relatively objective and externally observable social structures, such as networks, associations, and institutions, and the rules and procedures they embody” (World Bank, 2002: 3). Cognitive social capital comprises “more subjective and intangible elements such as generally accepted attitudes and norms of behavior, shared values, reciprocity, and trust”.⁹ Cognitive social capital can explain the raise of ethnic based networks of SMEs in Asian countries (e.g. among Indians and Chinese) that provide the resources needed for the firm (see also Chapters 15 and 18 in this volume). Social capital thus consists of at least two dimensions (Paldam, 2000): (1) trust that can be divided into generalized trust and special trust, and the latter in turn into trust in the law enforcement system, trust in the political and administrative system, and local trust; and (2) cooperative ability, i.e. people's ability to work

together. Moreover, it is crucial whether the trust is specific (i.e. constrained to one group) or generalized (i.e. to society as such).

It is generally argued that social capital, and the related concept such as trust, has implications for the interaction between agents/nodes in the Asian RIS. Contrary to that envisioned by mainstream economists, economic interaction is not primarily a market-based exchange of tangible goods by anonymous agents, regulated by a complete contract in the context of efficient contract enforcement. On the contrary, exchange relies on incomplete contracts, either due to the lack of possibilities for creating complete contracts, because of the disadvantages in terms of a low degree of flexibility built into complete contracts, or because of inefficient contract enforcement, depending on the mutual trust of the partners involved in the transaction.

However, our cases illustrate that a strong social capital is not equally necessary for all industries. In clusters of SMEs operating in traditional sectors, where tacit knowledge is predominant and the institutional framework is weak, a strong social capital might facilitate SMEs' access to human resources, machinery, and information required to upgrade. This is clearly the case in the Jepara furniture cluster, where social ties support initiatives to hire collectively qualified human resources, access to international markets, or gain economies of scale, when large orders coming from abroad to one firm are served by several SMEs linked to that firm. Social capital is also very important in the Taiwanese case. Small businesses form tight networks, encompassing personal and business relationships. These networks or *guanxi* are based on traditional Chinese social values, where human relationships are closely linked to families, relatives, friends, classmates, and previous colleagues (Liu, 1998; see also Chapter 4 in this volume) and occasionally segmented along dialect groups (e.g. Hakka, mainlander, and Taiwanese).

Social capital can also be exclusive. Compared to other types of clusters, where horizontal knowledge spillovers are considered crucial, this is not the case for the Thai automobile clusters. Networks are limited to first tier suppliers.¹⁰ Second third-tier suppliers do not connect to the network, as they do not meet the quality standards (Sevilla and Soonthornthada, 2000). As an example, only ten per cent of the Thai suppliers have ISO 9000, 14000 or 18000 certification. That is, collaboration based on social capital between Thai SMEs is not yet of much relevancy, as most Thai SMEs simply do not have the competencies, knowledge, and information that can create synergetic relationships.

Unless there is a high degree of social capital cooperation, communication and, thus, mutual learning is limited. In short, the absence of social capital in turn reduces the prospects

among local firms of getting access to important knowledge, knowledge sharing, and interactive learning, and, hence, entering a virtues development circle. Low social capital is usually associated with a high degree of competition and a lack of trust. Trust is built when firms do not see the partner as a competitor, but as someone bringing complementary skills to the joint venture. That is, consortia of SMEs have often been prone to failure, due to the competitive tendencies among group members. In the Bangalore software cluster, evidence suggests that they have been more effective, when member firms are complementing, instead of competing against, each other. Joint action has often involved marketing of products and seldom the development of a product (Nadvi, 1995).

Brokering institutions, such as entrepreneurial associations or cooperatives, can support the development of social capital and trust among the clustered SMEs. In the Taiwanese flower industry, the distribution of flowers to the domestic and international markets is in the hands of cooperatives and cooperative marketing teams, who also set the quality standards that the farmers should follow (Hsieh, 2001). In the Bangalore software cluster, entrepreneurial associations are commonly used to provide information to international companies on the different SMEs in the cluster. Brokering institutions are also an important element of the soft infrastructure of a RIS, and an important instrument for policy interventions at the regional and industry level.

Social capital also underpins the development of a regional or local absorptive capacity. Through localized knowledge sharing and interactive learning, knowledge can be disseminated locally/regionally, and provide the crucial insight that local firms need to move up the global value chain. But social capital might also transcend the regional boundaries of the cluster, as the Bangalore case illustrates. The social capital of the Indian transnational community played a crucial role in establishing the IT industry. To get access to orders, capital, and more sophisticated knowledge, the Indian firms were forced to target transnational corporations. This uncertainty allowed the Indian transnational community, who held important positions in American firms, to play a significant role in shaping the outsourcing decisions in American firms. Recently, one has witnessed a significant growth in interaction between Bangalore firms and American and European firms, as well as a diversification of the profiles of firms investing in Bangalore. The Bangalore firms have developed a certain degree of autonomy from the lead firms in the US and Europe. The autonomy is a function of investments in human capital and new managerial strategies; hence, they can now provide all types of services from the highest end of the value chain to the bottom end. This has allowed them to move up the global value chain.

In summary, social capital constitutes one of the elements of the regional system of innovation that can support the emergence and development of clusters of SMEs, and their upgrading. Social ties might facilitate the access to the required hard and soft resources for innovation (machinery, capital, skills, knowledge etc), as well as provide the required flexibility to cope with fluctuations in the market in terms of quantity.

Financial capital (hard infrastructure) in the Asian context

Financial capital, especially foreign capital, is a scarce resource in Asian countries; especially after the economic crisis in the late 1990s. Moreover, even when those funds reach the productive systems, SMEs usually find great difficulties accessing them. Financial capital is crucial for investing in human capital, and might even work as a useful means when building up social capital. For SMEs, it is also the way to acquire more sophisticated technology, or, in some cases, simply introduce some machinery, in their production processes.

In Asian countries, risk-seeking capital that deliberately aims at upgrading industrial production is crucial and but scarce. It is often a precondition for local firms to obtain possibilities for experimenting with new products or process innovation, and, subsequently, reducing their dependency on the TNCs. Moreover, when capital is scarce, it is tempting to use the available capital for satisfying short term needs, thus not investing in innovative projects, competence building etc., that is needed for long term growth. Additionally, SMEs usually do not fulfil the requirements, in terms of assets, posed by financial institutions to obtain a loan. They therefore have to rely on localized informal financial institutions.

Initiatives to build a venture capital community in Asian countries are rare, and, in some cases, the results not very satisfactory, as illustrated by the Bangalore case. Although the national government has made significant efforts in establishing a venture-capital community in India, the results have been puzzling. The development of venture capital in India can be divided into two periods: 1986-95 and 1995-currently (Avnimelech and Teubal, 2002). During the first period, the first set of guidelines for the emergence of venture capital firms was approved. The Indian government, with the support of the World Bank, financed the creation of four venture capital companies (VC) that were subsidiaries of state-controlled banks. One of them, the TDCI, was located in Bangalore. The results of this first phase were weak. Some of the reasons adduced to the failure were the high bureaucracy and the state control of the VC. During the second period, the market was open to private VC. The first foreign owned CV firm established in the 1990s, as well as the first 100% privately owned CV. During this second phase, non-resident Indians, who are members of the transnational

community, have become significant investors. Nevertheless, the VC infrastructure in India remains weak, highly bureaucratized, and overruled.

In the absence of an institutionalized financial structure, social capital can facilitate the access to financial resources, as some examples in Asia show. When there is not a reliable infrastructure to provide SMEs with risk capital, or when the SMEs do not fulfil formal demands from financial institutions, social networks might provide the access to micro-credits and loans. In the Jepara cluster, for example, immigrants are an important source of funding for the cluster (Supratikno, 2002 cf. Tambunan, 2005). This is also the case for the software cluster in Bangalore.

Lead firms in the cluster, suppliers or buyers can finance the acquisition of technology, or even the training of the human resources. But in most of the cases, access to funds provided by TNCs, for example, is limited to a number of SMEs, as shown in the Thai automotive cluster. Only SMEs in the first tier might benefit from some support by TNCs. As demonstrated by Ramachandran (1993) and Technakanont (2003), TNCs spend more resources on technology transfer to wholly owned subsidiaries than to joint ventures, while they expended the smallest quantity of resources on independent local firms (Technakanont, 2003).

The government can also play an important role in the provision of financial support for indigenous SMEs, as the Taiwanese case shows. SMEs in the cluster could not finance research activities, nor did the Taiwanese producers initially consider investing in these areas, as they did not realize the potential. Moreover, to financing R&D, the governmental financial support has been mainly in the form of loans at preferential rates for the construction of greenhouse facilities explicitly targeting at groups of SMEs. However, the RIS seems to be weak in the provision of funds for other purposes, such as upgrading of skills, participation in international trade fairs, etc. That is, the amount of financial capital committed by the government for the upgrading of the cluster is high, but limited somehow when it comes to the provision of hard infrastructure.

In summary, SMEs are bounded by their local conditions, in particular to their regional systems of innovation and their clusters. When discussing the role of the RIS in Asian countries and its impact on local SMEs, it is important to take into account different forms of capital and their relationships: social capital, human, and organizational capital, financial capital and physical capital (infrastructure). Upgrading of SMEs in developing countries in general is possible, when these four forms of capital are present, and the SME can find in the local milieu (RIS) the resources needed to innovate.

Composition of RIS and the upgrading strategy of the clustered SMEs

In the previous sections, we have dealt with the elements of the RIS one by one. We have claimed that human capital, social capital, financial capital, and physical capital are important infrastructural elements for the development of SMEs. However, these elements are tightly intertwined. For instance, a cluster of SMEs might be based on strong and very well functioning social ties. The most successful producers in the cluster might provide financial support to other producers for the acquisition of technology. Successful producers might even buy machinery that they rent out to other producers in the cluster, therefore facilitating the technology upgrading to a greater number of SMEs. Technological upgrading may attract the attention of international buyers and human capital, thus reinforcing the overall growth of the cluster. Far from being a hypothetical picture, this process can be observed in several clusters of SMEs in Asia, and points out to the systemic character of the different elements of the RIS.

There is not one single best case in upgrading clusters of SMEs, but rather there seem to be important differences between industries, as shown in Table 19.2 and discussed below. Furthermore, how SMEs use the RIS infrastructure depends on their upgrading strategy. The main motive for local SMEs to innovate is to access global markets, as the four cases discussed in this chapter point out. But how they use soft and hard infrastructure in the RIS for that purpose varies significantly across cases.

Traditionally SMEs in the Jepara furniture cluster had focused on the domestic market, where quality standards were low and requirements in terms of design were often not fitting the taste of the international customer. The situation changed in the mid 1980s, when the government sponsored the participation of Java furniture producers in an international fair in Bali. As a consequence, international buyers started to show interest in local production. Since then, large international buyers (e.g. IKEA) have dominated the cluster. These buyers “translate” the demands of the final international customer to local producers. Indigenous SMEs have followed two types of strategies to access the global market (Loebis and Schmitz 2005): although the majority of producers have opted to reduce costs (low salaries, illegal raw materials, avoid taxes), few furniture makers have opted to compete by upgrading processes and products. The later strategy has implied the introduction of new managerial and organizational changes, including compliance with international quality and environmental standards.

In the Taiwan flower industry, the strategy has been quite different. Technological upgrading, especially the orchid production, is clearly linked to the investments in

biotechnology, and the linkages with the knowledge providers of the RIS (universities and research centres). Until very recently, Taiwanese producers relied only on “natural” species that could be produced in most Asian countries, hence not a source of long-term competitiveness. Now, they are experimenting with non-natural varieties that display particular aesthetic features and longer durability. These are the outcome of an emerging collaboration between producers and biotech institutes. This collaboration has provided opportunities for developing new species (e.g. the blue orchid). Realizing the full potential of this collaboration is, however, contingent on establishing the right links between producers, researchers, and final markets (through appropriate marketing channels). Currently, collective action is frequent, but limited to one activity of the value chain (i.e. production or marketing), and hence appears fragmented. Orchids are rather easily copied or imitated, but since Taiwan has and is developing specialized knowledge and related support institutions within these fields, Taiwan can engage in constant upgrading, and, thus, protect themselves against imitators and sustain their long-term competitiveness. SMEs are responsible for the production and, to some extent, the marketing of the product. Most of the activities are based on indigenous Taiwanese firms and TNCs have only a limited role.

However, TNCs play a crucial role in the Thai automotive industry, as they control and define the scope of innovation in the cluster. Until recently, the Thai SMEs played a significant role as first or second tier subcontractors for TNCs. Formal policies from the Thai central government stipulated that TNCs locating in Thailand had to guarantee a certain local content in production. TNC were obliged to link up with local manufacturers. However, in the last few years, Thai SMEs have either been reduced to third or fourth tier subcontractors, or been bought up or gone bankrupt.¹¹ This can be attributed to the general deregulation enforced by the WTO/GATT. The Thai government interpreted the WTO/GATT agreement as entailing the dismantlement of the local content requirement, and a general opening of the economy to FDI. As a result, TNC subsidiaries have established production in the Thai clusters and out-competed Thai SMEs.

Moreover, new strategies among major assemblers in product innovations place a new demand on local subcontractors. In this context, it is possible to distinguish between two types of SMEs and upgrading opportunities: foreign and joint venture firms seem to have preferential access to the required technology and resources through their parent companies. Unfortunately, this is only a minority in the cluster. For the vast majority of SMEs in the sector, technological improvement is only the result of in-house efforts and the improved experience of employees (Techakanont and Terdudomtham, 2004). Human and

organizational capitals are the main determinants of the upgrading of these SMEs. Most SMEs do not comply with the international quality standards required by TNC assemblers to be first-tiers suppliers.

The provision of human capital does not seem to be a problem anymore in the Bangalore case. Innovation is the result of the interaction with large foreign clients. As in the Thai Automotive cluster, the dynamics of the IT cluster in Bangalore are influenced by the large TNCs located there. It is possible to find two types of SMEs: those tied to a TNC through a subcontracting agreement, and a limited number of independent SMEs. Frequently, Thai SMEs undertake task specific job, such as moulding specific parts of the car, for the large client firm who settles the parameters of the production and the final outcome, and tightly controls the performance of the SME. For a majority of these SMEs, large firms define innovation, whereas SMEs are only responsible for maintaining quality standards at minimum costs (Nadvi, 1995; Vang and Overby, forthcoming). Occasionally, SMEs suggest marginal modifications to large firms, based on their expertise. Beside this large group of SMEs and networks, it is possible to find some independent SMEs, usually driven by highly qualified people that decide to run their own firms. These firms retain their own design and production capacity, and try to position their products in the local market and, to a lesser extent, abroad. The limited cooperation between SMEs and the lack of financial resources are clearly hampering this process.

In sum, the general principle that different (upgrading) strategies demand different combinations of resources can be applied also to the analysis of RIS. Each strategy requires a different combination of soft or hard infrastructure. For example, human capital seems to be more critical for the Jepara furniture and the Thai automotive clusters now, than it is for the Bangalore software cluster and the Taiwanese flower industry. And the construction of social capital is more crucial now for the software cluster in Bangalore, than for the Jepara furniture cluster. Acknowledging these differences has important implications for innovation policy.

Innovation policy for SMEs – learning from the cases

This section aims at drawing some lessons for the design and implementation of innovation policies to support Asian SMEs from a RIS perspective. The lessons are based on the cases; hence, we do not suggest they can be automatically applied to other clusters and RIS. Instead, it serves the purpose of illustrating the need for a diversity of innovation policies to support SMEs. We critically use the RIS framework to discuss how the hard and soft infrastructure of the RIS and their systemic propensities might influence the innovative performance of the Asian SMEs; and how the government can invest selectively in the weak

and critical nodes of the infrastructure to support SMEs innovative capabilities and upgrading in general.

Innovation policies usually follow best practice models based on high tech clusters located in high performing regions, and only a small number of SMEs benefit from these policy measures. In this chapter, we argue that when designing innovation policy for SMEs, policy makers need to take into account the different dynamics of regions and clusters of SMEs. We have so far discussed innovation patterns in four clusters of SMEs in Asia, in relation to the hard and soft infrastructure of the RIS in which each cluster is operating. The four clusters represent the four most common industries in the region: traditional industry, resource-based industry, complex product systems industry, and specialized software. The cases illustrate how traditional industries or resource-based industries, which tend to be ignored by innovation (technology) policies in Asia, have significant potential in terms of innovation. Hence, these cases illustrate that traditional industries remain potential platforms for upgrading in developing countries (Mylteka and Farinelli, 2000), and that policy makers need to adopt a broader perspective on the innovation processes in these industries.

One of the first conclusions to draw from these cases is that there is a need for innovation policies targeting the particular needs of SMEs operating in different industries. Unless such measures are taken, SMEs are not likely to engage in noteworthy innovations or upgrading in general. Subsequently, the SMEs will at best maintain their role as low cost subcontractors to TNCs and will not exploit their economic potential. In the worst scenario, they could even lose their position as subcontractors, by being out-competed by world players. The cases also suggest that designing and implementing innovative policies for Asian SMEs requires an approach that pays attention to the territorial decision structure, and the specific combination of hard and soft infrastructure that constitutes the appropriate support for Asian innovative SMEs.

Decentralized decision-making structure

Applying the RIS approach has proven useful as the point of departure for the design of innovation policies to support SMEs in Asian countries. In contrast to other more atomistic approaches working with the same variables, but in isolation, the systemic approach considers the links and dependencies of the different institutions and organizations that constitute the entire innovation system. Thinking “systemic” allows selective interventions in the weakest nodes in the system and/or on the most critical nodes. Selectivity is crucial for Asian countries where financial resources are extremely scarce. The systemic approach facilitates the identification of dependencies and complementarities between variables. This

in turn can help policy makers to avoid policy interventions focusing on just one variable of the system, which might lead to decreasing returns in the absence of complementary investments. As an example, additional investment in human capital in the Bangalore region will not pay off, unless it is combined by demand side investments.

The cases tend to support the general claim in the RIS and cluster-literature, arguing in favour of decentralized decision-making structures. This is supported by the behavioural pattern of the Asian SMEs, whose interactions tend to be embedded locally. Highly centralized government bodies tend to lack relevant local knowledge, and base their interventions on aggregated data that often fails to capture both local and industry specificities. Thus, the particular needs of local SMEs, the morphology of local networks, and so forth are often ignored. For these reasons, centralized governments might even intervene in counterproductive ways. As mentioned earlier, this calls for a decentralized decision-making structure. However, there is a need to highlight the still relevant role of the centralized government agencies and a need to argue against a “one-size-fits-all” territorial decision-making structure.

Across the industries, centralized government bodies continue to play a crucial role in generating general policies of relevancy for the innovative performance by SMEs. The importance of replacing the import substitution industrialization strategy with an export-oriented strategy in the Indian case is almost paradigmatic for illustrating this. Equally important is that centralized governmental bodies need to define the general formal rules of the game, such as formal law and working standards, to avoid a situation in which regions use national policies to engage in a cost-based competition against each other. Decentralization of such policies is likely to hamper the innovation performance of SMEs.

The morphology of the decentralized decision-making structure is also contingent on the industry and institutional setting, as the cases illustrate. It can take two forms: (1) all major decision rights can or should be allocated to the regional governments, or (2) central government bodies have or should have located local government branches, with a high degree of autonomy, in the relevant regions and clusters. In the latter case, there is an additional need to pay attention to the parts of the policy process that need to be decentralized (e.g. design and/or implementation).

While it is still too early to come up with a rule of thumb on when the first or second type of decentralized decision-making structure should be applied, the cases seem to suggest the following. First, industries relying on highly localized idiosyncratic knowledge tend to benefit most from a decision-making structure based on regional government bodies. The

Jepara furniture cluster can illustrate this. The case points to how the regional government has been effective in identifying some the weakest and most crucial nodes in the RIS, with respect to the internationalization of the clustered SMEs. Second, industries relying on global standards and/or high capital entry-barriers tend to be best facilitated by the central government's premises located in the region. This comes out most clearly in the Bangalore IT software case, where the central government's ISS policies have been important in the development of the cluster, and educational institutions function well, despite being under central rule. The Thai automobile case also suggests the need for a strategy based on the decentralization of central government bodies, as scale economies benefit from a centrally coordinated strategy.

Soft and hard infrastructure

The appropriate territorial decision-making structure assures the provision of information on weak nodes and complementarities in the RIS/cluster, and thus on where and how to intervene with respect to soft and hard infrastructure. The industry specific RIS policies can draw on a palette of different supply and/or demand side policies. Focus can be on providing timely and qualified human resources, supporting the creation of social capital and effective networks between SMEs and TNCs, supplying physical infrastructure, business support services, and financial capital, and supporting access to markets. Industry and institutional contingencies dictate the areas (hard and soft infrastructure) in which a governmental intervention is most needed in the RIS, e.g. investments in human capital, or scientific infrastructure, etc.

Before presenting the case specificities it should be noted that across all the cases, the innovative performance by Asian SMEs tends to be constrained by a lack of managerial skills in the broadest sense, especially of the manager or the owner of the firm. Intervention in this area seems to be critical for all Asian industries considered in the study. In traditional industries, as illustrated by the Jepara furniture cluster in Indonesia, the major weakness in the SMEs in the cluster is in upgrading the local craftsmanship to meet international demands. This can be solved partly if local manufacturers can link up to international buyers and international markets directly. This is possible when they are price competitive, provide the right design, comply with required international standards (environmental mainly), and are known actors on the international market. For SMEs not possessing the skills needed for harvesting the benefits from collaborating directly or indirectly with international buyers, the government needs to provide information on international demands, standards, and

international markets, and facilitate the access to international markets (e.g. supporting the presence of local SMEs in international trade fairs).

However, providing information is only one variable in the equation. SMEs also need to change their productive competences, according to the demands of the global markets. The government can contribute to the development of SMEs by providing or supporting the development of business development services, such as training, testing, supply chain management, and certification. Training targeted at soft elements of the innovation processes, usually marketing or managerial skills or organizational change, is clearly needed. The strength of the local networks can facilitate the dissemination of successful managerial practices.

In resource-based industries, collaboration between knowledge providers (e.g. universities and research institutions) and producers, as well as the provision of hard scientific infrastructure and qualified human capital, are central cornerstones in the policy agenda. This type of collaboration can facilitate, for example, the invention of new species, more resistant ones, or similar. Local producers can then enter international market with a knowledge intensive new product, creating a new niche market. This is clearly the strategy of producers in Taiwan that attempt to become a world leader in orchid production. The Taiwanese government has focused largely on the provision of hard infrastructure for the sector, and not much on the soft infrastructure. Although most producers seem to have the required technical skills, they lack managerial and marketing skills. Their market information is very limited, and their access to new techniques is contingent on formal linkages with biotechnology firms.

The policies in CoPS, like the Thai automotive clusters, are highly dependent on the TNCs' willingness to provide assistance on technological upgrading and building of design competencies, as this is beyond the scope of indigenous SMEs. When TNCs provide this type of information/assistance, it is mainly to first tier suppliers. SMEs do not play a significant role as first tier suppliers, as most indigenous SMEs do not comply with international quality standards required by TNCs. The cases illustrate that at least two strategies are possible. One is to regulate the relationship between the TNC and the SME, for example, forcing TNCs to subcontract with indigenous SMEs. This regulatory policy may face potential conflicts with the WTO. While this might seem a viable solution in the short term, it does not provide the right incentives for SMEs to acquire new competences, as the Thai case shows.

The second strategy is for the government to focus directly on improving the competences of indigenous SMEs. Centralized government bodies, including technical

colleges and universities, need to build organizations physically present in the clusters, as this is where the SMEs are located. This will allow central government bodies to develop the needed local knowledge. Moreover, these government bodies need to be equipped with a sufficient high degree of autonomy that allows them to act on the basis of local knowledge. The combination of centralization and decentralization will allow for harvesting some economies of scale in the development of indigenous technologies. In a slightly longer time perspective, the decentralized structure might provide a foundation that will allow for more social capital based horizontal collaboration, which might become relevant when the investments in human and organizational capital is “in place” and indigenous technologies developed. Increasing the absorptive capacity of firms will set the foundations for the introduction of quality standards in the SMEs that, in turn, will improve the possibilities for recuperating their position in the first tier.

Finally, policies targeting specialized suppliers, as illustrated by the Bangalore case, initially consist of building the required human capital level to engage in cost-based collaboration with TNCs. Once this level is attained, the largest problem that the SMEs in these types of industries in Asia are currently facing is getting the high value assignments that would allow them to position in higher value parts of the value chain. While the SMEs might have the formally needed competencies for undertaking these activities, TNCs do not know or do not trust yet the ability of indigenous SMEs to undertake these activities. This prevents them from transforming their formal competencies into “real” competencies; this transformation requires user-producer interaction. This problem is central, as SMEs cannot rely on localized lead users. In parallel, knowledge tends not to be distributed within the clusters of co-located firms. Thus, after initial phases with investments in human capital, public interventions should focus on public procurements, where public government bodies function as lead users demanding local interaction.

Conclusion

We started the chapter with the general claim that innovation policies in Asia have tended to support high tech sectors dominated by large firms. It is estimated that only 3% of the SMEs benefit from this policies, as they are high tech SMEs. The cases have illustrated that SMEs across industries do have an unrealized potential. They can compete in international markets, even in mature or traditional industries, if there is the right support locally. Unfolding this potential is a matter of understanding the specific needs of local SMEs, and identifying the weakest nodes in the regional system of innovation. In order to reach the largest amount of

SMEs, policy makers need to focus on clusters of SMEs, that is, the policy target should be groups of SMEs, not isolated SMEs.

This chapter has contributed to the current discussion of innovation policies in Asia in many ways. First, we provide an analytical framework – the RIS – to unfold the system propensities in which the activity of the SMEs is embedded, the hard and soft infrastructure, and how they relate to the SMEs needs, and the use of the innovation system approach in practice. Second, we particularize the analysis in relation to four most common clusters of SMEs in Asia, identifying some general patterns within the clusters and the main differences across these clusters. And, finally, we provide some guidance to policy makers on how to intervene and support these clusters, with the provision of hard and soft infrastructure.

Endnotes

¹ It is not the purpose of this chapter to discuss the adequacy of these high tech oriented policies in the developing world as such, and we do acknowledge that some of the countries have obtained very successful results, e.g. India, South Korea, Singapore.

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² SMEs are constituted by a variety of types of firms, in terms of size of their financial assets and/or number of employees. No single coherent definition exists (OECD, 2002). The SMEs range from formally established firms engaged in traditional manufacturing to semi-formal sweatshops and informal – and occasionally criminal – activities involving only the household or the family. Moreover, some SMEs are producing intermediaries to firms in

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global value chains, while others produce end-products to their regional markets only. The definitions used in national statistics are also different for each country in Asia, and the rest of the world for that matter. Currently, the SME department of the World Bank considers the following definitions: micro-enterprises (up to 10 employees, total assets of up to US\$10,000 and total annual sales of up to US\$100,000); small enterprises (up to 50 employees, total assets and total sales of up to US\$3 million; medium enterprise (up to 300 employees, total assets and total sales up to US\$15 million). We focus on the formal sectors of SMEs in this chapter.

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³ Currently, the specific programs targeting at SMEs in Asia found in almost all countries are high tech oriented. Most of them, if not all, are targeting at specific groups of firms (start-ups) or specific sectors (ICT, software), where there is a high probability of finding high tech SMEs. This group, however, only represents about three per cent of the SME population.

This means that the majority of SMEs are ignored almost completely in all innovation policies. Of the remaining 87 per cent, approximately 65 per cent are considered to be technology users or potential innovators (Clarysse and Uytterhaegen, 1999).

⁴ Malmberg and Maskell (2002) have reduced interaction in clusters to be based on observability only; this might be relevant in some industrial clusters, but mainly for a minor segment based on physical production.

⁵ For example, the Chilean salmon cluster, the orchid cluster in Taiwan, the apple cluster in Brazil, etc.

⁶ Physical capital as infrastructure is crucial for economic development, but this is not the core area of RIS. We therefore refer to UNDP (2004) for detailed elaborations on this topic.

⁷ South Korea, Singapore, and Taiwan are the exception, with net enrolment rates in primary school close to 100 per cent.

⁸ Until very recently, formal policies by the Thai central government stipulated that TNCs locating in Thailand had to guarantee a certain local content in the production. TNCs were obliged to link up with local manufacturers. This in turn reduced the incentives of SMEs to increase their qualifications.

⁹ The World Bank (2002: 3) further notes that “Although these two forms of social capital are mutually reinforcing, one can exist without the other. Government-mandated organizations represent structural social capital in which the cognitive element is not necessarily present. Similarly, many relations of mutual trust persist without being formalized in organizations.

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This description of social capital according to its forms has proven quite useful as a basis for empirical analysis”

¹⁰ For example, one of the consequences of Japanese leadership was to create several automobile industry cooperative clubs for assemblers and first-tier suppliers.

¹¹ While bankruptcy was accelerated by the economic crisis in Asia in late 1990s, this cannot hide the fundamental structural problems faced by the Thai automotive industry.

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References

- Albu, M. (1997), 'Technological Learning and Innovation in Industrial Clusters in the South', SPRU electronic working papers, SPRU, University of Sussex.
- Amin A. (2004), 'Regulating economic globalization', Transactions of the Institute of British Geographers, 29(2), 217-233.
- Asheim, B. and L. Coenen (2005), 'Knowledge Bases and Regional Innovation Systems: Comparing Nordic Clusters', Research Policy, 34(8), 1173-.
- Asheim, B., L. Coenen and M. Svensson-Henning (2003), 'Nordic SMEs and Regional Innovation System'. Oslo: Nordisk Industrifond.
- Asheim, B. and M. Gertler (2004), 'Regional Innovation Systems and the Geographical Foundations of Innovation in J. Fagerberg, D. Mowery and R. Nelson. (eds), The Oxford Handbook of Innovation, Oxford: Oxford University Press, pp. 291-317.
- Asheim, B. and A. Isaksen (2002), 'Regional Innovation System: The Integration of Local 'Sticky' and Global 'Ubiquitous' Knowledge', Journal of Technology Transfer, 27: 77-86.
- Asheim, B., A. Isaksen, C. Nauwelaers and F. Töedting (2003), Regional Innovation Policy for Small-Medium Enterprises. Cheltenham: Edward Elgar.
- Asheim, B. and J. Vang (Forthcoming), 'Regions, Absorptive Capacity and Strategic Coupling with High tech TNCs: Lessons from India and China', forthcoming in *Society, Science and Technology*, Sage
- Avnimelech, G. and M. Teubal (2002), 'Venture capital in Israel. A comparative analysis and lessons for other countries', Hebrew University Israel. <http://economics.huji.ac.il/faculty/teubal/VCPolicyBrusselsDraft2.pdf>
- Becker Gary (1998), 'Human capital and poverty. Religion and Liberty', 8 (1), not numbered, accessed on <http://www.acton.org/publicat/randl/article.php?id=258>.
- Berry, A., E. Rodriguez and H. Sandee (2002), 'Firm and Group Dynamics in the Small and Medium Enterprise Sector in Indonesia', Small Business Economics 18, 141-161.
- Bitran, E. (2004), 'Sistema de Innovación, Consorcios Tecnológicos y Clusters Dinámicos En Chile', En Foco, Santiago de Chile: Expansiva.
- Clarysse, B. and M. Uytterhaegen (1999), 'Inside the Black Box of Innovation: Strategic Differences between SMEs', University of Ghent.
- Cohen, W. and D. Levinthal (1990), 'Absorptive Capacity: A New Perspective on Learning and Innovation', Administrative Science Quarterly, 35, 128-152.
- Cooke, P. and K. Morgan (1998), The Associational Economy: Firms, Regions and Innovation. Oxford: OUP.

- Cooke, P. and D. Will (1999), 'Small Firms, Social Capital and the Enhancement of Business Performance through Innovation Programmes', Small Business Economics, 13, 219-234.
- Das, T. (2003), 'Promoting Resource-Based Export Oriented Smes in Asia and the Pacific', Investment promotion and enterprise development bulletin for Asia and the Pacific, 1, 33-76.
- Dhungana, B. (2003), 'Strengthening the Competitiveness of Small and Medium Enterprises in the Globalisation Process: Prospects and Challenges', Investment promotion and enterprise development bulletin for Asia and the Pacific, 1, 1-32.
- Fröbel, F., J. Heinrichs and O. Kreye (1980), The New International Division of Labor, Cambridge: Cambridge University Press.
- Giuliani, E. (2004), 'Laggard Clusters as Slow Learners, Emerging Clusters as Locus of Knowledge Cohesion (and Exclusion): A Comparative Study in the Wine Industry', *LEM Working papers*, Pisa, Laboratory of Economics and Management -Sant'Anna School of Advanced Studies.
- Giuliani, E. and M. Bell (2005), 'When Micro Shapes the Meso: Learning Networks in a Chilean Wine Cluster', Research Policy, 34(1), 47-68.
- Granovetter, M. (1985), 'Economic Action and Social Structure: The Problem of Embededness', American Journal of Sociology, 91, 481-510.
- Hsieh, S.-C. (2001), Taiwan Assisted Flower Production and Marketing in Paraguay, ICDF report.
- Kaufmann, A. and F. Tödting (2002), 'How Effective Is Innovation Support for Smes? An Analysis of the Region of Upper Austria', Technovation, 22, 147-159.
- Lecler, Y. (2002), 'The Cluster Role in the Development of the Thai Car Industry: Some Evidence from Empirical Studies', International Journal of Urban and Regional Research, Volume 26(4), 799–814.
- Liu, S.-J. (1998), 'Industrial Development and Industrial Adaptation in Taiwan: Some Issues of Learned Entrepreneurship', IEEE Transactions on engineering management, 45(4), 338-347.
- Loebis, L. and H. Schmitz (2005), 'Java Furniture Makers: Globalization winners or losers?', Development and practice, 15(3-4), 514-521
- Lundvall, B.-A. (ed) (1992), National Systems of Innovation. Towards a Theory of Innovation and Interactive Learning. London, Pinter.

- Lundvall, B.-A. and S. Borrás (2004), 'Science, Technology and Innovation Policy', in J. Fagerberg, D. Mowery and R. Nelson (eds), The Oxford Handbook of Innovation, Oxford: Oxford University Press. 599-631.
- Lundvall B.-Å., I. Patarapong and J. Vang (eds) (Forthcoming), Asia's Innovation Systems in Transition, Cheltenham: Edward Elgar.
- Malmberg, A. and P. Maskell (2002), 'The elusive concept of localization economies: towards a knowledge-based theory of spatial clustering', Environment and Planning 34 (3), 429-449.
- Martin, R. and P. Sunley (2003), 'Deconstructing Clusters: Chaotic Concept or Policy Panacea?', Journal of Economic Geography, 3, 5-35.
- Mylteka, L. and F. Farinelli (2000), Local Clusters, Innovation Systems and Sustained Competitiveness, INTECH Discussion Paper Series, Maastricht.
- Nadvi, K. (1995), Industrial Clusters and Networks: Case Studies of SME Growth and Innovation, Vienna: UNIDO.
- NASSCOM (2005), www.nasscom.org, Accessed on September 20, 2005.
- OECD (2002), Enhancing Competitiveness of Smes through Innovation, Paris.
- Oyelaran-Oyeyinka, B. and K. Lal (2004), Learning New Technologies by Smes in Developing Countries, INTECH Discussion Paper Series (2004-9), 38.
- Paldam, M (2000), 'Social Capital: One or Many? Definition and Measurement', Journal of Economic Surveys, 14(5), 629-653.
- Parthasarathy, B (2004), 'India's Silicon Valley or Silicon Valley's India? Socially Embedding the Computer Software Industry in Bangalore', International Journal of Urban and Regional Research, 28(3), 664-685.
- Pavitt, K. (1984), 'Sectoral Patterns of Technical Change: Towards a Taxonomy and a Theory', Research Policy, 13(6), 343-373.
- Pietrobelli, C. and R. Rabellotti (2004), 'Upgrading in Clusters and Value Chains in Latinamerica: The Role of Policies', Sustainable department Best Practices Series, New York: Inter-American Development Bank, 97.
- Porter R. (1998), Clusters and the new economics of competition, Harvard Business Review, 76(6), 77-90.
- Ramachandran, V. (1993), 'Technology Transfer, Firm ownership and Investment in Human Capital', Review of Economics and Statistics, 75, 664-670.
- Romer, P. (1990), 'Endogenous Technological Change', Journal of Political Economy, 98(5), 71-102.

- Samart, C. (2004), Production Networks, Trade and Investment Policies, and Regional Cooperation in Asia: A Case Study of Automotive Industry in Thailand, Paper presented in The 6th ADRF General Meeting, 2004 Bangkok, Thailand. http://adrf.trf.or.th/ADRF6update/Full_Papers/Trade&Investment/Samart_Chiasakul/Fu llpaper_Samart.pdf
- Sandee, H. (1998), 'Promoting Small-Scale and Cottage Industry Clusters in Indonesia', Small Enterprise Development, 9, 52-58.
- Sandee, H. and P. Rietveld (2001), 'Upgrading Traditional Technologies in Small-Scale Industry Clusters: Collaboration and Innovation Adoption in Indonesia', Journal of Development Studies, 37(4), 150-172.
- Schmitz, H. (1992), On the Clustering of Small Firms, IDS bulletin - Institute of Development Studies, 23, 64-69.
- Sevilla, R. C. and K. Soonthornthada (2000), SME Policy in Thailand: Vision and Challenges, Nakhon Pathom: Institute for Population and Social Research, Mahidol University.
- Taiwan Council of Agriculture (2003), COA Annual Report 2003, [http:// www.coa.gov.tw/coa/end/publications/](http://www.coa.gov.tw/coa/end/publications/)
- Taiwan Ministry of Economic Affairs (2004), White paper on Small and Medium size enterprises in Taiwan.
- Tambunan T. (2005), 'Promoting small and medium enterprises with a clustering approach : a policy experience from Indonesia', Journal of Small Business Management, 43(2), 138-154.
- Techakanont, K. (2003), 'An Analysis of the Determinant of Inter-firm Technology transfer: A case of the Thai Automobile Industry', Thammasat Economic Journal, 21(3), 145-173.
- Techakanont, K. and T. Terdudomtham (2004), 'Evolution of Inter-firm Technology Transfer and Technological Capability Formation of Local Parts Firms in the Thai Automobile Industry', Journal of Technology Innovation, 12(2), 151-183.
- Tsai, J. (2001), 'The Comparative Advantage of Taiwan's Major Cut Flowers', Agricultural Economics, 47(6), 265-270.
- Tsai, K.-H. and J.-C. Wang (2002), 'An Examination of Taiwan's Innovation Policies and R&D Performance', Taiwan: Chung-Hua Institution for Economic Research, Division of Taiwan Economy.

- Tunzelmann, N. V. and V. Acha (2004), 'Innovation in 'Low-Tech' Industries', in J. Fagerberg (ed), The Oxford Handbook of Innovation, Oxford: Oxford University Press, pp. 407-432.
- UNDP (2004), Unleashing entrepreneurship: Making business work for the poor, UNDP report.
- UNIDO (United Nations Industrial Development Organization) (1997), 'Progress and Prospects for Industrial Development in Least Developed Countries (Ldsc) - Towards the 21st Century', at Fourth LDC Ministerial Symposium: Industrial Capacity Building and Entrepreneurship Development in LDCs with particular emphasis on agro-related industries, Vienna: United Nations
- UNIDO (United Nations Industrial Development Organization) and UUND Program (2004), Partnerships for Small Enterprise Development, New York: United Nations.
- Vang, J. & M. Overby (forthcoming), 'Transnational Communities, TNCs and Development: The Case of the Indian IT-services Industry', in Lundvall B.-Å., I. Patarapong I & J. Vang (eds), Asia's Innovation Systems in Transition, Cheltenham, UK and Lyme, US: Edward Elgar.
- Von Hippel, E. (1988), Sources of Innovation, Oxford: Oxford University Press.
- World Bank (1998), Social Capital in Africa, Downloaded from <http://www.worldbank.org>.
- World Bank (2002), Understanding and Measuring Social Capital. A Multidisciplinary Tool for Practitioners, New York: World Bank.
- World Bank (2003), World Development Indicators 2003, New York: World Bank.
- Zahra, S. A., and G. George (2002), 'Absorptive capacity: A review, reconceptualization, and extension', Academy of Management Review, 27(2), 185-203.

Table 19.1 Main clusters of SMEs in Asia

Groups	Industries	Learning patterns	Description
Traditional manufacturing industries	Textile and garments, footwear, furniture, ceramic tiles	Mainly supplier dominated, labour intensive firms	<ul style="list-style-type: none"> • Process innovation mainly and small incremental product innovation. Clustering facilitates organisational innovation. • Most new techniques originate from machinery and chemical industries • Opportunity for technological accumulation is focused on improvements and modifications in production methods and associated inputs, and on product design • Competition based on costs • Externalities involve the access to workers specialized skills, the linkages with specialized local supply of inputs and services, dissemination of specialized know-how and information, shared machinery and infrastructure and access to international markets. • Information flows through informal channels facilitated by the local cohesion within the cluster as well as a result of the rotation of workers among the firms in the cluster.
Resource-based industries	Sugar, tobacco, wine, fruit, dairy, mining	Supplier dominated, science-based	<ul style="list-style-type: none"> • Importance of basic and applied research lead by public research institutes due to low appropriability conditions • Most innovation is generated by suppliers (machinery, seeds, chemicals, etc). • Most innovations and growth of these clusters are the result of the cooperation with scientific institutions. • Increasing importance of international sanitary and quality standards and of patents. • Upgrading of SMEs in these clusters can be with or without the intervention of a large firm. In some cases, upgrading is the result of joint technology development and coordinated actions between firms, business associations, universities and other actors. In some others, TNC provide the technology and knowledge required for the upgrading of the local SMEs
Complex product	Automobile and	Scale intensive	<ul style="list-style-type: none"> • Technological accumulation is generated by the design, building and operation of complex

systems industries	auto parts, aircraft, consumer electronics	firms	<p>production systems or products. Radical innovation is risky.</p> <ul style="list-style-type: none"> • Process and product technologies develop incrementally (modular production systems). For consumer electronics, technological accumulation emerges mainly from corporate R&D labs and universities. • Medium appropriability, high barriers to entry. • Local SMEs are usually required to comply with international quality standards in order to participate in the network. Large assembler firms usually determine the scope of change of the local network of subcontractors. • Externalities for geographical concentration are scarce, as both the leader firm and the assembler operate globally • Most knowledge needed in the production process is codified thus the need to interact with local suppliers is limited
Specialized suppliers	Software	Specialized suppliers	<ul style="list-style-type: none"> • Often small firms. Important user-producer interactions. Learning from advanced users. • Low barriers to entry and low appropriability • High in-house R&D for development of cutting edge technologies. • SMEs in this category tend to concentrate geographically to gain access to the labour market and the consumers. Formal joint cooperation between firms is limited • Technological innovation is product innovation although upgrading is also the result of non-technological innovation such as joint marketing initiatives or changes in the organisation. <p>Mobility of human resources among the different firms is an important channel for knowledge diffusion across the cluster</p>

Source: Adapted from Pietrobelli and Rabelotti (2004: 8).

Table 19.2 Comparison of the Asian cases

	Traditional Jepara cluster	Resource-based Taiwan flower industry	CoPS Automotive Thailand	Specialized suppliers Software Bangalore
Stylized facts about the cluster	<ul style="list-style-type: none"> - Located on Java, Indonesia - About 2000 small firms, 100 large and medium ones - 40,000 permanent employees - Firms are dispersed across 80 villages in the Jepara region - 70% Production goes to international markets 	<ul style="list-style-type: none"> - Production dominated by small farms (1 ha per family) - Remarkable growth over the last decade as a consequence of increased domestic demand and increased exports (mainly Japan and the US. - Main competitors are Thailand or China. - Clear division of labor between the production and commercialization of flowers exists 	<ul style="list-style-type: none"> - Strongly dominated by TNC assemblers. Local SMEs are usually 2nd and 3rd tier, with very limited access to knowledge and technology. The first tier consists of more than 700 companies. 40% of these are owned by TNCs. Fully Thai-owned companies constitute 50%; but only 10% of the value. Second tier suppliers are around 1000 firms - Around 113,512 are employed in the industry. SME accounts for approximately 50% percent of the employees - The Thai automobile industry is constituted by several clusters - Diseconomies of agglomeration (ranging from increased wages, scarcity of workers to traffic congestion) have resulted in the emergence of new clusters scattered around Thailand - Thailand is the most important hub for automotive production in Asia. 	<ul style="list-style-type: none"> - Most important IT cluster outside US - Cluster with strong presence of multinational firms but dominated by SMEs. - Bangalore houses several high tech clusters (defense, aeronautics and IT). It is the scientific and engineering centre of India - India's best research university- Indian Institute of Science is based in Bangalore. Competitiveness is based on easy access to qualified and relatively cheap technical human capital; Only 10-15 percent of the revenues of the sector are from SMEs

	Traditional Jejara cluster	Resource-based Taiwan flower industry	CoPS Automotive Thailand	Specialized suppliers Software Bangalore
			- Most major assemblers are present in Thailand	
Regional autonomy	High Due to geographical fragmentation and ethnical diversity. National policy is highly limited. Regional governments are responsible for designing and implementing policies in the region.	High Taiwan is considered to be one region with complete <i>de facto</i> political autonomy from mainland China	Low Thai innovation system is highly centralized (when it comes to the automotive industry). Policy-making, budget allocation is centralized in Bangkok. Regions do not hold any important decision making powers, nor competencies or capacities	Medium While Bangalore has a certain degree of autonomy the IT cluster is more shaped by the industrial development in the US than local cluster-effects and regional government bodies' policies. The state apart from providing basic sound macro-economical policies and other programs is not considered to be a main player in terms of regional policies

	Traditional Jepara cluster	Resource-based Taiwan flower industry	CoPS Automotive Thailand	Specialized suppliers Software Bangalore
Strategies for upgrading (role of TNC-SME)	<p>Innovation is customer driven. But most firms do not have direct access to the large international buyer. Joint actions to attend international trade fairs (supported by the government) have been very successful</p>	<p>Innovation is science-driven. Growth of the industry is the result of interaction between biotech institutes and private industry. This is the result of deliberate policy initiatives generated by the Taiwanese government. High coordination between researchers – market-producers is needed. Government can play a role in supporting the interaction between these institutions</p>	<p>Innovation is TNC driven. The TNC defines the scope of change and only SMEs that are 1st ties have access to knowledge and information on the market. SMEs that want to be part of the TNC network need to comply with international quality standards. Only 10% of the SMEs have an ISO certification. Government has a great role encouraging and supporting SMEs to obtain such quality standard.</p>	<p>Innovation is customer driven. But for many firms the customer is the TNC. They work on job-work basis, as subcontractors, and their scope for upgrading and innovating is limited. Another group of SMEs have opted to be independent. They have better chances to enter international markets, if they are able to gain recognition. Support from the government to attend international trade fairs could have a positive impact.</p>
Human Capital	<p>Craft industry. Knowledge acquisition is by learning by doing. There are a limited number of very qualified human resources that are shared by several SMEs and large firms. Managerial and marketing skills</p>	<p>Knowledge is very fragmented in three groups: Producers only know about production techniques, but nothing about the market. Marketing of the flowers is dominated by “marketing” firms. And innovation in the</p>	<p>Production is dominated by blue collar workers. Competition is based on costs, quality standards and to a lesser extent on <i>just in time</i>. Learning is limited as production is according to blueprints. Upgrading requires formal training in</p>	<p>Firms have easy access to qualified human resources. The region houses an important number of education and training institutions. So the technical skills are ensured. However, managerial and marketing skills could be strengthened.</p>

	Traditional Jejara cluster	Resource-based Taiwan flower industry	CoPS Automotive Thailand	Specialized suppliers Software Bangalore
	are needed.	cluster is driven by advances in biotechnology, with researchers in labs relatively isolated from producers and markets.	engineering and design.	
Social capital & networks	Social capital is strong, based on kinship and family ties. Collective action is common, both to access machinery and to attain economies of scale.	Social capital is strong, based on Chinese values and collective action common. However, networks seem to be confined to one activity (production, research or commercialization).	Social capital is weak. Some initiatives like the Toyota's sponsored Automobile Industry Club only reaches first tiers. Collaboration between the SMEs and collective action is almost inexistent, not even to achieve efficiency based on specialization. Government could support the introduction of quality standards to groups of complementary SMEs.	Social capital is relatively weak, based on the alumni network and the mobility of workers. Collective action exists, especially for marketing purposes and to a lesser extent to share technological knowledge or gain economies of scale. However, collective action has been hampered by fierce competition between the firms. Cooperation is successful when based on specialization. Government could play a role supporting collective initiatives of complementary firms and providing information of the SMEs core business.
Financial Capital	Weak support by financial institutions. Cluster works on micro credits among the	The upgrading of the cluster via investment in research and technology requires vast	Introducing quality standards is a costly process. Most of the SMEs in the cluster do not have any access to financial capital. Only	VC market in India suffers from excessive regulations and bureaucracy. Funding is provided by some TNC and

	Traditional Jejara cluster	Resource-based Taiwan flower industry	CoPS Automotive Thailand	Specialized suppliers Software Bangalore
	producers (based on social capital)	amounts of financial capital provided by the government and some international large firms.	SMEs in the first tier might benefit from some support from the TNC.	members of the transnational community returning from the US (or just setting up some business in India). Public procurement is non-existent.
Policy	The presence of the government in the cluster has been limited. However, some of the initiatives (like promoting the attendance to international trade fairs) have been very successful. More support for the development of human capital, specially managerial and marketing skills, provision of information on international trends and facilitating direct access to the customer is needed.	Success in this cluster is based on coordination of the different actors (producers, researchers and customers) as well, access to information on international opportunities and trends and the provision of infrastructure (scientific mainly). The government has a great role to play in setting the RIS infrastructure and connecting the relevant actors.	Latest Thai policy towards the sector has been quite detrimental for the SMEs as it eliminated the obligations of TNC to local manufacturers. Government has a role to play in the provision of soft and hard infrastructure for the cluster: qualification of human resources, introduction of quality standards, support of collective action and specialization (upgrading in the value change), encouraging a change of strategy from cost reduction to quality and specialization (knowledge based), and put back the obligations of TNC towards indigenous SMEs.	Government has an important role fomenting collective actions among SMEs in the cluster, focusing on specialization and not competition. Assistance for international trade fairs could facilitate the insertion of these SMEs in international market. Public procurement could also be a powerful incentive for the local SMEs. Finally, upgrading managerial skills to complement the high technical skills is needed.

Sources: Berry et al (2002); Lecler (2002); NASSCOM (2005); Parthasarathy (2004); Sandee (1998), Sandee and Rietveld (2001); Taiwan Council of Agriculture (2003); Taiwan Ministry of Economic Affairs (2004); Techakanont and Terdudomtham (2004); Tsai (2001); Tsai and Wang (2002); Samart (2004).