

INDUSTRIAL CLUSTERS, SCHUMPETERIAN INNOVATIONS AND ENTREPRENEURS' HUMAN AND SOCIAL CAPITAL A Survey of Literature

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Abstract. In developing countries, to achieve poverty alleviation, it is important to develop industrial clusters because they not only create substantial survival-type employment opportunities in the manufacturing sector but also seed-beds for further industrial development by creating economies of agglomeration. However, most of the industrial clusters in developing countries have performed poorly relative to what appears to be their growth potentials. In search of what are the decisive factors that affect the dynamic development of a cluster, this short article underscores the importance of Schumpeterian innovations and entrepreneur's human and social capital for the cluster's long-term survival, sustainability, and competitiveness. Further, this study suggests that by providing training to entrepreneurs of the existing clustered enterprises, rapid industrial development can be achieved in developing countries.

Keywords: Industrial clusters, Human capital, Social capital, Developing countries

JEL classification: L6, O2

I. INTRODUCTION

It has been increasingly recognized by policy makers and researchers that industrial development is indispensable for poverty reduction and to attain the sustainable economic growth (*e.g.*, David and Otsuka, 1994; Hayami *et al.*, 1998; Otsuka, 2006; Sonobe and Otsuka, 2006). Particularly, in

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developing economies, one policy that has attracted the growing attention of governments, private voluntary organizations, the donor community and researchers is the development of industrial clusters of micro-, small-, and medium-sized enterprises (MSMEs) because they not only hold the potential of generating massive employment opportunities, dampening forced out-migration from rural to urban areas and bridging the development gap between the well-endowed and the marginalized but also “seed-beds” for further industrial development by creating economies of agglomeration as Marshall (1920) originally pointed out (*e.g.*, Nadvi and Schmitz, 1994; Schmitz and Nadvi, 1999; Sonobe and Otsuka, 2006).

Even though industrial clusters inherently contribute to the development of industries by creating economies of agglomeration, the past few decades have observed different and sometimes contrasting development paths of the industrial clusters in different countries. A large number of industrial clusters in East Asia and Latin America have been developed to produce high-quality products, while many industrial clusters in Sub-Saharan Africa and South Asia are stagnant or expand only in terms of the number of enterprises without any improvement in productivity, product quality, marketing and management, and thus performed poorly relative to what appears to be their growth potential. Many such clusters are now subject to intense global competition that has been magnified by domestic policies aimed at opening up and liberalizing the domestic markets. Clusters unable to compete are forced out, thus intensifying poverty. Therefore, effective policies aimed at upgrading stagnant industrial clusters in developing countries are badly needed.

An important question is why some industrial clusters have successfully developed while others have not been able to. By reviewing the literature on the successful development of industrial clusters in East Asia and other countries, this article underscores the importance of Schumpeterian innovations and entrepreneurs’ human and social capital for the cluster’s long-term survival, sustainability, and competitiveness.

The rest of this paper is organized as follows: Section II reviews why enterprises form industrial cluster, why clusters are desirable, and how clusters facilitate enterprise growth. Sections III and IV draw some experiences from East Asia and other developing countries to illustrate the process of successful industrial development, placing particular emphasis on the importance of innovation and entrepreneurs’ human and social capital in the development of industrial clusters. The conclusion and policy implications are contained in Section V.

II. CLUSTERS AND INDUSTRIAL DEVELOPMENT

DEFINITION OF AN INDUSTRIAL CLUSTER

There is a variety of different concepts and definitions of industrial cluster in the literature having roots in business economics, innovation studies and development economics. For example, Porter (1990) defined a cluster as a geographic concentration of interconnected companies and institutions in a particular field. Rosenfeld (1995) defined a cluster as a loose, geographically bounded agglomeration of similar, related firms. Similarly, Swann and Prevezer (1996) defined an industrial cluster as a group of firms within one industry based in one geographic area. Schmitz and Nadvi (1999) defined a cluster as a sectoral and spatial concentration of firms. Brenner (2004) also defined a local industrial cluster as an industrial agglomeration that is caused by local self-augmenting processes. Morosini (2004) defined an industrial cluster as a socioeconomic entity characterized by a social community of people and economic agents localized in close proximity in a specific geographic region. Sonobe and Otsuka (2006) defined an industrial cluster as a geographical concentration or localization of enterprises producing similar or closely related goods in a small area.

There are few points worth noting in the above definitions of an industrial cluster. First, is the importance of the spatial proximity and geographic scope of the cluster which greatly facilitates the flow of crucial business related information central to the capability to innovate. Second, a cluster is a dynamic phenomenon. It is not only the localized concentration of linked industries but the particular process that leads to the development of the interaction and functional relationships between firms. Last, social infrastructure such as trust and a shared vision is important.

SIGNIFICANCE OF INDUSTRIAL CLUSTERS

Industrial clusters, in the last two decades, have gained considerable attention from economists and researchers because of their contribution to employment generation, poverty alleviation and provision of a favourable environment for further industrial development by creating economies of agglomeration (*e.g.*, Krugman, 1991; Nadvi and Schmitz, 1994; Hayami *et al.*, 1998; Schmitz and Nadvi, 1999; Sonobe and Otsuka, 2006). Agglomeration economies, which lead to economies of scale at the level of an industry rather than at the level of an individual enterprise, induce enterprises to locate close to each other (Schmitz and Nadvi, 1999; Henderson *et al.*, 2001).

According to Marshall (1920), the agglomeration economies arise from:

- (i) knowledge and technology spillovers;
- (ii) specialization and division of labour among enterprises; and
- (iii) labour pooling.

Knowledge and technology spillovers refer to technological external economies that arise when new ideas on new products, inputs, production processes and marketing channels of innovative enterprises become available to other enterprises without any compensation. The knowledge and technology spillovers take place through sheer imitation of products and production processes, turnovers of workers, spin-offs, and face to face interactions. According to Porter (1998), the diffusion of technological knowledge enhances enterprises' capacity for innovation and competitive pressure within each cluster increases enterprises' incentive to innovate. According to the endogenous growth models of Lucas (1988, 1993) and Romer (1986, 1989), knowledge spillover is critical for sustainable economic growth. The empirical literature has proved that knowledge spillovers tend to be localized (*e.g.*, Jafe *et al.*, 1993; Feldman, 1994). Thus, enterprises located in an industrial cluster take more benefit of knowledge spillovers than dispersed enterprises.

The second benefit of industrial clusters, identified by Marshall (1920), is the specialization and division of labour among enterprises. Suppliers of specialized inputs and services emerge in industrial clusters since the demand from a large number of co-located enterprises is large. The availability of such specialized inputs and services, in turn, enables new enterprises to enter the industry by specializing in a particular stage of production without much initial capital investment (*e.g.*, Humphrey and Schmitz, 1996; Schmitz and Nadvi, 1999). To put in a different way, industrial clusters permit new enterprises to take small and calculable risks to enter the industry or they enable small enterprises to overcome growth constraints and to develop in small "riskable steps" (Schmitz and Nadvi, 1999).

Most of the literature on economic geography (*e.g.*, Krugman, 1991) often points out that specialization and division of labour among enterprises occurs because of low transportation costs owing to the geographical concentration of firms in a small area. However, Sonobe and Otsuka (2006) argue that low transaction costs among enterprises rather than transportation costs in industrial clusters enhance the development of the division of labour and facilitate the transactions of intermediate goods and services among enterprises. According to Sonobe and Otsuka (2006), in a cluster it will be

immediately noticed if some firms attempt to over-utilize asymmetric information, or pass substandard goods as premium grade, or create hold-ups in order to exploit market shortages. Behaviour of this kind puts firms on a black list which deprives them from information and trading opportunities. Through this sanction mechanism, firms in an industrial cluster create a mutual understanding and trust that reduces malfeasance and facilitates trade.

The third advantage of industrial clusters identified by Marshall (1920) in addition to knowledge spillovers and the specialization and division of labour among enterprises is labour pooling. Labour pooling refers to the presence of a labour force with specific skills suitable for the particular industry in the cluster. Industrial clusters attract skilled workers and managers because the demand for skills specific to industry is large due to the co-location of a large number of enterprises. This means that new enterprises entering the cluster can easily employ skilled workers, as the transaction costs involved in the search for the desired quality of workers are low. New enterprises are also likely to enjoy relatively low wages as competition among skilled workers is likely to prevent a monopoly from arising and thus help to keep wages at low levels (Glaeser *et al.*, 1992).

According to Sonobe and Otsuka (2006), information spillovers which are essentially imitations are closely related with the development of skilled labour markets. The latter enhances the former through spin-offs and labour turnover. Since imitation also takes place through transactions of intermediate inputs, information spillovers are also inseparably related with the specialization and division of labour.

Firms that are clustered may also become involved in joint actions, in which they may share machinery, agree to split an order, share the costs of marketing, lobby government, and participate in other collective activities. The benefits that are generated through these collective actions are referred to as “collective efficiencies” (Schmitz, 1995b; Nadvi, 1999a, 1999c), which are defined as “the competitive advantages derived from the local economies and joint actions”.

The scarcity of market information, which is one of the major bottlenecks on the small firm growth, can also be reduced in a cluster through traders. According to Knorringa (1999), traders play an important role by providing information on the products and designs demanded by consumers. Moreover, traders also introduce new information on improved products and productions methods. Clusters attract traders because they have a wider choice of producers and products to choose from. Furthermore, the cost of searching and negotiating between traders and producers tends to be

low in clusters because of the concentration and competition of a large number of producers in a small area (*e.g.*, Levy, 1991; Sonobe *et al.*, 2002, 2004; Yamamura *et al.*, 2003). As a result, enterprises located in industrial clusters are generally more market-oriented, profitable, and able to grow in size faster than other enterprises.

Another important barrier to the growth of micro- and small-sized enterprises (MSEs) is deemed to be the lack of working capital. It is believed that micro- and small-sized enterprises (MSEs) are discriminated by the formal financial institutions because of the high transaction costs of small credits under information asymmetry (Wenner, 1995). Firms in industrial clusters are likely to be less credit constrained due to the relatively low cost of credit transactions especially those related with informal credit. In Italy, firms located inside industrial clusters enjoy lower credit costs, have better financial relations with banks, and tend to be less credit constrained than firms located outside the cluster (Russo and Rossi, 2001).

Industrial clusters have played a crucial role in the economy of Japan during the high growth period from 1960 to 1973 (Mano and Otsuka, 2000). Other economies such as Taiwan (Amsden, 1977; Sonobe and Otsuka, 2006), China (Sonobe *et al.*, 2002), India (Knorrinda, 1999; Tewari, 1999; Chari, 2000), Brazil (Meyer-Steiner, 1998; Schmitz, 1999b), and Mexico (Rabelloti, 1995, 1997, 1999) have also registered significant and rapid cluster led economic growth. In Taiwan, small enterprises were induced to form clusters in suburban areas to capture the benefits of inert-firm transactions (Sonobe and Otsuka, 2006), while in the Philippines, low transaction costs arising from the benefits of agglomeration enabled subcontractors located in garment and metal craft clusters to earn relatively high incomes (Sonobe and Briones, 2001). In rural Indonesia, the development of social capital reduced transaction costs, which attracted traders to the clustered enterprises. Thus, the cottage industry in rural Indonesia owes its success to the importance of clustering at the early stages of development: accessibility to credit that was once a big problem for micro- and small-sized enterprises (MSEs) was eased due to the proliferation of formal and informal credit sources, innovations and imitation were common, and so was the sharing of orders and subcontracting, while the division of labour was also practiced by successful firms. This provided the clusters with stimuli to expand (Weijland, 1999).

Despite the benefits of industrial clusters, many industrial clusters in developing countries have performed poorly relative to what appear to be their development potential (*e.g.*, McCormic, 1999; Altemburg and Meyer-

Stamer, 1999). This raises a question as to why some clusters have developed dynamically while many others stagnate. In search of what is important in the successful development of industrial clusters, in the following two sections, this article reviews the literature on the importance of Schumpeterian innovations in industrial clusters and the roles of entrepreneurs' human and social capital in cluster-based industrial development.

III. SCHUMPETERIAN INNOVATIONS IN INDUSTRIAL CLUSTERS

Schumpeter (1912) argued that industries develop through a series of innovations and imitations, where innovation is nothing but a new combination of productive resources to increase profit. Schumpeterian innovations encompass the introduction of a new good or a new quality of good, new production method, new production organization, new market, and the discovery of new materials. Entrepreneurs seeking high profit are the carriers of such innovations. When these entrepreneurs succeed in innovations, new producers attracted by the higher profit will enter the industry by imitating the innovators. The entry of the new producers will expand the supply, lower the price, and decrease the profit of the innovators, thereby forcing entrepreneurs to innovate further. In this way, industries develop over time.

Closely related to the Schumpeterian innovations is the concept of multifaceted innovations in the endogenous model of cluster-based industrial development proposed by Sonobe and Otsuka (2006) based on eight case studies of the garment, motorcycle, machine tools, and low-voltage electric appliances clusters in East Asia. According to this model, the process of industrial development in a cluster can be divided into three distinct phases: the initiation phase, quantity expansion phase, and quality improvement phase. The model states that a few innovative entrepreneurs initiate the industry by conducting reverse engineering of imported products, or copying technology already introduced elsewhere. If the products are technically easy to produce, the industrialization tends to be led by merchants, and if the products are technically difficult to produce, the development is often engineer-led. The initiation phase is characterized by a great deal of trial and error since there is limited availability of the required parts, material, and workers in the domestic market. The market for parts and components is not yet present and the quality of the final products is generally low, but owing to the low income level of the economy, there exists a demand for such low-quality but cheap substitutes for expensive imported products.

After the successful initiation of the cluster, a number of workers, who have learnt the established production and marketing methods of the pioneer enterprises, spin-off and establish their own enterprises. They are the followers in the sense of Schumpeter (1912) and they produce the same or similar products using the same or similar parts and equipment. The cost of market transaction at this stage is low since both final products and parts are simple and similar. The division and specialization of labour develop between manufacturers and part-suppliers and between manufacturers and traders, with transaction usually undertaken through impersonal markets. New enterprises are located near each other and industrial clusters are ultimately formed. As Marshall (1920) noted, enterprises located in industrial clusters easily imitate new technology developed by other enterprises, purchase (or sell) parts and intermediates products from (or to) other enterprises, and hire workers with the required skills, because industrial clusters facilitate the acquisition of inputs, technology, and market information at relatively low transaction costs. The availability of intermediate inputs at the market place and traders who handle the marketing of the simple and standard products massively attracts new entrants who produce the low quality standard goods. Sonobe and Otsuka (2006) refer to this phase as the quantity expansion phase because production expands with negligible productivity gains and quality improvement.

The quantity expansion phase is characterized by declining product prices and a rise in material prices as a result of the expansion of production due to the massive entry which outweighs product demand. The decrease in product price might discourage the innovative efforts of producers. Fortunately, innovation cost has also reduced as a variety of skilled human resources gathered in one place during the formation of the industrial cluster and provide opportunity for innovative producers to adopt innovations ranging from finding new sources of input to exploring new marketing channels. Producing high quality differentiated products requires the use of high quality materials and employing highly skilled workers. To appropriate the benefit of producing high quality products, producers need to use new marketing channels to reach final buyers in order to differentiate high quality products from imitated standardized products in the market. Such successful multi-faceted innovations lead the cluster to enter the quality improvement phase.

Examples of such multifaceted improvements can be found in the literature. For example, in the case of the low voltage electric appliances cluster in China, the major innovations involved the introduction of quality inspection and own branding (Sonobe *et al.*, 2004). Enterprises in a footwear

cluster in Ethiopia increased the direct procurement of materials and the direct sales of products as well as established brand names when they improved product quality (Sonobe *et al.*, 2009). In Nairobi, Kenya, garment mini-manufacturers improved the quality of products and linked up with traders, and as a result, they outperformed tailors (Akoten and Otsuka, 2007). In Italy and Brazil, when the pressure of competition increased, shoe manufacturers turned to the long-term subcontracting system by finding competent part-suppliers (Rabellotti, 1995; Schmitz, 1999b). In contrast, when specific and complicated parts were required, enterprises increase the internal production of key parts to improve quality as in the case of surgical instrument manufacturers in Pakistan (Nadvi, 1999c). In Tiruppur in India, the improvement in the quality of material, the diversity of garment products, and increasing exports have contributed to the rise of the cotton knitwear industry (Cawthorne, 1999).

A major characteristic of the quality improvement phase is that the productivity of the industry as a whole rises sharply partly because of the exit of inefficient enterprises and partly because the surviving enterprises improve products and production processes. Another characteristic is the reemergence of large enterprises who produce and sell high quality products with brand names through networks of their sales agencies and own retail outlets. In fact, some industrial clusters in developing countries have entered this phase with such innovations while others remain stagnant (Sonobe *et al.*, 2002, 2003, 2004; Yamamura *et al.*, 2003, 2005; Sonobe and Otsuka, 2006; Akoten *et al.*, 2006). Thus, the literature suggests that the key to the sustained growth of industries is the innovation or the new combination of resources in the Schumpeter (1912) sense. Although the importance of multifaceted improvements is fully explored, the literature has seldom paid attention to examine the characteristics of the innovative entrepreneurs. For instance, Nadvi (1999c) reports that to improve the quality, in the surgical instruments cluster in Sialkot in Pakistan, enterprises have increased the internal production of specific and complicated parts. Similarly, Rabellotti (1995) and Schmitz (1999b) report that in Italy and Brazil when the pressure of competition increased, shoe manufacturers turned to the long-term subcontracting system by finding competent part-suppliers. However, these studies do not examine what characterizes the entrepreneurs behind such innovative improvements. In order to draw policy implications to promote the development of industrial clusters, the determinants of such improvements need to be identified. The next section of this article is, therefore, devoted to review the literature on the determinants of the

multifaceted improvements in industrial clusters focusing on the roles of the entrepreneurs' human and social capital.

IV. ROLES OF HUMAN AND SOCIAL CAPITAL IN CLUSTER-BASED INDUSTRIAL DEVELOPMENT

ROLES OF ENTREPRENEURS' HUMAN CAPITAL

Human capital is important since it improves the ability to decode and adopt new information (Schultz, 1975; Becker, 1962, 1993). Because the information processing ability is critical to absorb new technologies and to carry out innovation, human capital plays an essential role in economic growth (*e.g.*, Nelson and Phelps, 1966; Romer, 1986, 1989; Lucas, 1988; Abramovitz, 1989; Barro, 1991; Mankiw *et al.*, 1992; Grossman and Helpman, 1994). It is not easy to measure human capital; however, in the literature on human capital, the level of formal education or the number of schooling years are standard measures used as proxies for human capital. The distinction is made between general education to acquire general knowledge, which is not specifically related to the business sector and entrepreneurial activities, and specific education to attain certain knowledge through courses in special fields or through the pursuit of advanced degrees in specialized areas (Madson *et al.*, 2003). However, it is insufficient to use only educational attainment to measure human capital since it leaves out the relevance of experience and practical skills acquired through learning-by-doing (OECD, 2000). Indeed, the human capital theory provides insights into the important roles of human capital acquired by experience such as marketing experience and management experience in the entrepreneurship (Becker, 1975; Von Hippel, 1988; Shane, 2000; Kim *et al.*, 2006; Fairlie and Robb, 2007).

Despite the general importance of human capital, the existing literature on industrial clusters seldom examines it empirically. An exception is Sonobe and Otsuka (2006) who empirically examined the role of human capital in the process of the development of industrial clusters. They point out that enterprise managers cannot innovate if high-quality human resources are lacking, because in absence of human capital resources the cost of innovation is too high. They hypothesize that the tradition of manufacturing and commerce and general education level of the country are the important determinants of the availability of high-quality human resources in industrial clusters. Their argument on the roles of human capital acquired by schooling in the development of industrial clusters is supported by their findings from eight industrial clusters ranging from garments to printed circuit boards in

China, Taiwan and Japan. In all of the eight clusters they studied, Sonobe and Otsuka (2006) found that generally highly educated entrepreneurs led the industries to the quality improvement phase by taking the initiatives in improving the product quality, production organization, and marketing channels. As a result, these entrepreneurs tend to have larger operation size and higher productivity. It is important to note that in industrial clusters in other developing countries in Asia and Africa, there is a striking similarity in the important roles of the entrepreneur's general human capital (Sonobe *et al.*, 2002, 2003, 2004, 2009; Yamamura *et al.*, 2003, 2005; Akoten *et al.*, 2006; Akoten and Otsuka, 2007; Nam *et al.*, 2009, 2010). In a comparative study of dynamic and stagnant clusters in Latin America, Altenburg and Meyer-Stamer (1999) found that the former abound with highly educated managers and engineers, whereas the latter do not. In a nutshell, the human capital acquired by schooling is commonly found to be critical for the development of industrial clusters.

In addition to formal education, the entrepreneurs' skills and management abilities, which improved through learning by doing during the quantity expansion stage, facilitate the transition to the quality improvement stage (Sonobe and Otsuka, 2006). For instance, in the motorcycle clusters in Japan, the entrepreneur's work experience is important for the survival of the enterprise (Yamamura *et al.*, 2005). In the printed circuit board clusters in China the entrepreneur's knowledge from their work experience has continual positive effects on the choice of product lines, the product quality, and the growth of the enterprises (Sonobe *et al.*, 2004). In the garment clusters in China (Sonobe *et al.*, 2002), and in Japan (Yamamura *et al.*, 2003), the entrepreneur's prior experience in marketing contributed to the improvement in the quality of products, the increase in the direct transaction with outside traders and the productivity of the enterprise. These findings suggest that the entrepreneur's industry-specific and firm-specific human capital acquired by experience in marketing and management contributes to the growth of the enterprise.

ROLES OF ENTREPRENEURS' SOCIAL CAPITAL

The idea of social capital owes its prominence mainly to the work of Robert Putnam (1993) in political science, James Colman (1988, 1990) in educational sociology and Francis Fukuyama (1995) in economic history and sociology. According to Coleman (1988), "social capital is defined by its function as it is not a single entity, but a variety of different entities having two characteristics in common: they all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the

structure". Putnam (1993) defined social capital as "features of social organization, such as trust, norms, and networks that can improve the efficiency of society." Fukuyama (1999) defined social capital as "a certain set of informal rules or norms shared among members of a group that permits cooperation among them."

The common theme of these definitions is that social capital discourages opportunistic behaviours and induces people toward cooperation through a mechanism of shared values, norms, and trust, which arise from informal organizations based on social networks which Fukuyama (1995) defined as a group of individual agents that share informal norms or values beyond those necessary for ordinary market transactions. Putnam (2001) further divided the social network into informal and formal social networks. Formal networks include ties to voluntary associations such as trade associations and the like, while informal networks include ties held between family members, friends, and neighbors. Among the informal networks, Finch and Mason (1993) made a distinction between family ties within and beyond the household. The connections among families, friends, and firms play an important role in determining the institutional mode of transactions as they affect the transaction cost (Ben-Porath, 1980). Fukuyama (1995) emphasized that families are inevitably an essential source of social capital everywhere, and despite the change in family structure, kinship remains the most powerful form of social relationship in contemporary societies.

An immense amount of research on the roles of social capital in economic development shows that social capital can be a powerful means to foster the diffusion of knowledge and reduce transaction costs by generating trust and discouraging opportunistic behaviours (Granovetter, 1985; Coleman, 1988; Putnam, 1993; Fukuyama, 1995; Knack and Keefer, 1997; Bowles and Gintis, 2002; Fafchamps and Minten, 2000; Durlauf and Fafchamps, 2004). Indeed, trust acts as a lubricant that makes organization run more efficiently (Fukuyama, 1999; Field, 2003). In developing countries, mutual trust accumulated through personal interactions in the community helps reduce transaction costs and supports market transactions (Hayami, 1998; Hayami and Godo, 2005).

Several studies have attempted to analyze the roles of social capital in the development of industrial clusters. Saxenian (1994) argued that social networks are the most important factors in the creation of a local system of firms and play a leading role in the development of co-located economic activities. Furthermore, social capital significantly influences the establishment of new enterprises in industrial clusters. Stable social networks

can explain why new entrepreneurs usually decide to begin a new venture in the same place where they have lived (Aldrich and Zimmer, 1986; Aldrich, 1999; and Shane and Venkataraman, 2000), and the start-up process is inserted in a dense network of existing social relationships (Gulati, 1999). In addition, social networks can be used to explain why some firms are more successful in starting and developing businesses than others (Aldrich and Zimmer, 1986).

According to Nabi (1988), in a farm equipment manufacturing cluster in Pakistan, the large Lohar bradari (caste) helped fellow Lohars to acquire the technical knowledge that was crucial for them to enter the industry. In a study of small-scale manufacturing entrepreneurs in Ghana, Barr (2000a) found support for her hypothesis that networks of business-related contacts positively contribute to technical information flows among enterprises. Barr's (2000a) measure of networks was based only on the owner's personal contacts. In a surgical instrument cluster in Pakistan, where many of the enterprises are in the same extended families, family ties affect intra- and inter-firm relations and provide the enterprises with a network of outside contacts and valuable information that family members share with each other. In these extended families, important information such as how to conform to new quality control pressures is shared through informal and frequent exchanges among the family members (Nadvi, 1999b).

Networks of contacts can provide the basis for other types of firm level benefits beyond technical information flows. In a garment cluster in Kenya, social capital, measured by the number of relatives in the same industry, has positive effects on access to credit and the profitability of the enterprises (Akoten, Sawada, and Otsuka, 2006). Caniëls and Romijn (2003) identified that in a farm equipment industry cluster in Pakistan's Punjab province, occasional machining services and trade credit was given by well established enterprises to new outfits run by a member of the same bradari (caste). In a study of a garment cluster in Vietnam, Nam, Sonobe and Otsuka (2010) found that social capital of proprietors measured by kinship ties with overseas Vietnamese traders significantly contribute to the expansion of firms' exports. In a study of agricultural traders, Fafchamps and Minten (1999) concluded that the returns to social capital may be as high as or higher than the returns to labour or to physical or human capital in a world with transactions costs. An analysis of why Ghanaian entrepreneurs valued their networks found that they reduce search and contract enforcement costs (Barr, 2000b). Networks can also be the basis of collective action, though this is not common and usually only involves a subset of network members.

Several studies have attempted to analyze the roles of social capital in organizing collective action (*e.g.* Nadvi, 1999a, 1999b; Schmitz, 1999a).

The literature suggests that social capital benefits entrepreneurs in their quest for scarce resources. Therefore, in addition to differences in financial and human capital, heterogeneity in the performance of enterprises may also be attributed to entrepreneurs' different access to external resources by using their social capital (resources embedded in their social relations with others) to obtain information, financing, expert advice, and other resources.

V. CONCLUSION

In order to reduce the widespread poverty in low-income countries, appropriate policies to promote the development of micro-, and small-sized enterprises (MSEs) which provide ample employment opportunities for unskilled workers are badly needed. Literature on industrial development emphasizes the importance of industrial clusters as they provide the synergy through which MSEs may grow. However, evidences show that many industrial clusters in developing countries are stagnant or expanded only in terms of number of enterprises without any improvement in productivity, product quality, marketing and management and thus performing poor relative to what appears to be their growth potential. The upgrading of stagnant clusters in developing countries can be instrument in reducing extreme poverty.

The literature presented in this article calls for policies to support their transition from the quantity expansion phase to the quality improvement phase by providing appropriate needs-based training programmes. The provision of general education to entrepreneurs will enhance their ability to cope with ever changing business environments. The current entrepreneurs probably will not have time to go to school. Therefore, an effective programme that provides general education should be made available to young people. Such a programme requires time to take effect and, thus, it must be implemented with a long-term goal to ensure the sustainable development of the clusters. Second, short-term training programmes that equip the entrepreneurs with new knowledge on management, such as quality control, labour management, production organization, and new knowledge on marketing, should be provided. Because the provision of such knowledge has spillover effects and is often undersupplied by the private sector, government agencies, international organizations, and NGOs should provide these training programmes to the entrepreneurs. To the author's knowledge, such programmes are still lacking or have been inappropriately and

inadequately provided to the entrepreneurs in Pakistan. In order to upgrade stagnant clusters and thus to create enormous employment opportunities, effective and needs-based training programmes are clearly called for.

The literature reviewed in this article also advocates that social capital benefits entrepreneurs in their quest for scarce resources and is as important as their human and financial capital. In developing countries, the reliance of entrepreneurs on their social ties to gain access to trade credit, to new knowledge and information required for improving the product quality, and marketing channels demonstrates the unavailability of favourable business environments and entrepreneurs' weak marketing capacity. The absence of well-defined commercial laws regulating contract violations may be responsible for the excessive reliance of entrepreneurs on their social ties in their business. Strengthening the legal systems will also, therefore, promote the development of industrial clusters.

REFERENCES

- Akoten, John E. and K. Otsuka (2007), From tailors to mini-manufacturers: The role of traders in the performance of garment enterprises in Kenya. *Journal of African Economies*, Volume 16(4), pp. 564-595.
<http://dx.doi.org/10.1093/jae/ejl047>
- Akoten, John E., Y. Sawada and K. Otsuka (2006), The determinants of credit access and its impacts on micro and small enterprises: The case of garment producers in Kenya. *Economic Development and Cultural Change*, Volume 54(4), pp. 927-944. <http://www.jstor.org/stable/10.1086/503585>
- Aldrich, H. and C. Zimmer (1986), Entrepreneurship through social networks. In *The Art and Science of Entrepreneurship*, eds. D. L. Sexton and R. W. Smilor (3-23), Cambridge: MA Ballinger.
- Altenburg, T. and J. Mayer-Stamer (1999), How to promote clusters: Policy experiences from Latin America. *World Development*, Volume 27(9), pp. 1693-1713. [http://dx.doi.org/10.1016/S0305-750X\(99\)00081-9](http://dx.doi.org/10.1016/S0305-750X(99)00081-9)
- Amsden, Alice H. (1977), The division of labour is limited by the type of market: The case of the Taiwanese machine tool industry. *World Development*, Volume 5(3), pp. 217-233. [http://dx.doi.org/10.1016/0305-750X\(77\)90025-0](http://dx.doi.org/10.1016/0305-750X(77)90025-0)
- Baptista, R. and G. M. P. Swann (1999), A comparison of clustering dynamics in the US and UK computer industries. *Journal of Evolutionary Economics*, Volume 9(3), pp. 373-399. <http://dx.doi.org/10.1007/s001910050088>
- Barr, A. (2000a), Social capital and technical information flows in the Ghanaian manufacturing sector. *Oxford Economic Papers*, Volume 52(3), pp. 539-559.
<http://dx.doi.org/10.1093/oep/52.3.539>
- Barr, A. (2000b), Collective action and bilateral interaction in Ghanaian entrepreneurial networks. Working Paper No. 182. WIDER, the United Nations University, Helsinki.
- Becker, G. S. (1975), *Human Capital*, 2nd edition. Cambridge: National Bureau of Economic Research.
- Becker, G. S. (1993), *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*, 3rd edition, Chicago: The University of Chicago Press.
- Becker, Gary S. (1962), Investment in human capital: A theoretical analysis. *Journal of Political Economy*, Volume 70(5), pp. 9-49.
<http://www.jstor.org/stable/1829103>
- Becker, Gary S. and Kevin M. Murphy (1992), The division of labour, coordination costs, and knowledge. *The Quarterly Journal of Economics*, Volume 107(4), pp. 1137-1160. <http://dx.doi.org/10.2307/2118383>

- Ben-Porath, Yoram (1980), The F-connection: Families, friends, and firms and the organization of exchange. *Population and Development Review*, Volume 6(1), pp. 1-30. <http://www.jstor.org/stable/1972655>
- Bigsten, A., P. Collier, S. Dercon, M. Fafchamps, B. Gauthier, J. W. Gunning, A. Oduro, R. Oostendorp, C. Pattillo, M. Söderbom, F. Teal and A. Zeufack (2003), Credit constraints in manufacturing enterprises in Africa. *Journal of African Economies*, Volume 12(1), pp. 104-125. <http://dx.doi.org/10.1093/jae/12.1.104>
- Bowles, S. and H. Gintis (2002), Social capital and community governance. *The Economic Journal*, Volume 112(483), pp. F419-F436. <http://www.jstor.org/stable/798455>
- Brenner, T. (2004), *Local Industrial Clusters: Existence, Emergence, and Evolution*. London: Routledge.
- Cawthorne, Pamela M. (1995), Of networks and markets: The rise and rise of a South Indian town, the example of Triuppur's cotton knitwear industry. *World Development*, Volume 23(1), pp. 43-56. [http://dx.doi.org/10.1016/0305-750X\(94\)00106-9](http://dx.doi.org/10.1016/0305-750X(94)00106-9)
- Chari, S. (2000), The agrarian origins of the knitwear industrial cluster in Triuppur, India. *World Development*, Volume 28(3), pp. 579-599. [http://dx.doi.org/10.1016/S0305-750X\(99\)00143-6](http://dx.doi.org/10.1016/S0305-750X(99)00143-6)
- Coleman, J. (1990), *Foundations of Social Theory*. Cambridge: Harvard University Press.
- Coleman, James S. (1988), Social capital in the creation of human capital. *American Journal of Sociology*, Volume 94, pp. S95-S120. <http://www.jstor.org/stable/2780243>
- Dahl, Michael S. and C. R. Pedersen (2004), Knowledge flows through informal contacts in industrial clusters: Myth or reality? *Research Policy*, Volume 33, pp. 1673-1686. <http://dx.doi.org/10.1016/j.respol.2004.10.004>
- Davidsson, P. and B. Honig (2003), The role of social and human capital among nascent entrepreneurs. *Journal of Business Venturing*, Volume 18(3), pp. 301-331. [http://dx.doi.org/10.1016/S0883-9026\(02\)00097-6](http://dx.doi.org/10.1016/S0883-9026(02)00097-6)
- Fafchamps, M. (2004), *Market Institutions and Sub-Saharan Africa: Theory and Evidence*. Cambridge, MA: Massachusetts Institute of Technology Press.
- Fafchamps, M. and B. Minten (1999), Relationships and traders in Madagascar. *Journal of Development Studies*, Volume 35(6), pp. 1-35. <http://dx.doi.org/10.1080/00220389908422600>
- Fafchamps, M. and B. Minten (2002), Returns to social network capital among traders. *Oxford Economic Papers*, Volume 54(2), pp. 173-206. <http://dx.doi.org/10.1093/oep/54.2.173>

- Feldman, Maryann P. (1994), Knowledge complementarity and innovation. *Small Business Economics*, Volume 6(5), pp. 363-372.
<http://dx.doi.org/10.1007/BF01065139>
- Finch, J. (1989), *Family Obligations and Social Change*. Cambridge: Polity Press.
- Finch, J. and J. Mason (1993), *Negotiating Family Responsibilities*. London: Routledge.
- Fukuyama, Francis (1995), *Trust: The Social Virtues and the Creation of Prosperity*. New York: Free Press.
- Fukuyama, Francis (1999), *The Great Disruption*. New York: Simon and Schuster.
- Gambetta, D. (1988), *Trust: Making and Breaking Cooperative Relations*. Cambridge: Blackwell.
- Gemser, G. and N. M. Wijnberg (1995), Horizontal networks, appropriability conditions and industry life cycles. *Journal of Industry Studies*, Volume 2(2), pp. 129-140. <http://dx.doi.org/10.1080/13662719508538559>
- Glaeser, E. L., H. D. Kallal, J. A. Scheinkman and A. Shleifer (1992), Growth in cities. *Journal of Political Economy*, Volume 100(6), pp. 1126-1152.
<http://www.jstor.org/stable/2138829>
- Glaeser, Edward L., D. Laibson and B. Sacerdote (2002), An economic approach to social capital. *The Economic Journal*, Volume 112(483), pp. F437-F458.
<http://www.jstor.org/stable/798456>
- Granovetter, M. (1985), Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, Volume 91, pp. 481-510.
<http://www.jstor.org/stable/2780199>
- Grossman, Gene M. and E. Helpman (1994), Endogenous innovation in the theory of growth. *Journal of Economic Perspectives*, Volume 8(1), pp. 23-44.
<http://dx.doi.org/10.1257/jep.8.1.23>
- Gulati, R. (1999), Network location and learning: The influence of network resources and firm capabilities on alliance formation. *Strategic Management Journal*, Volume 20(5), pp. 397-420.
[http://dx.doi.org/10.1002/\(SICI\)1097-0266\(199905\)](http://dx.doi.org/10.1002/(SICI)1097-0266(199905))
- Hackett, S. M. and D. M. Dilts (2004), A systematic review of business incubation research. *Journal of Technology Transfer*, Volume 29(1), pp. 55-82.
<http://dx.doi.org/10.1023/B:JOTT.0000011181.11952.0f>
- Hall, B. H. (1987), The relationship between firm size and firm growth in the US manufacturing sector. *The Journal of Industrial Economics*, Volume 35(4), pp. 583-606. <http://www.jstor.org/stable/2098589>

- Hanifan, L. J. (1916), The rural school community center. *Annals of the American Academy of Political and Social Science*, Volume 67, pp. 130-138.
<http://dx.doi.org/10.1177/000271621606700118>
- Harvie, C. and H. H. Lee (2005), Korea's fading economics '1990-1997'. Economics Working Paper No. 05-09, School of Economics, University of Wollongong, NSW, Australia.
- Hayami, Yujiro (2009), Social capital, human capital and the community mechanism: Toward a conceptual framework for economists. *Journal of Development Studies*, Volume 45(1), pp. 96-123.
<http://dx.doi.org/10.1080/00220380802468595>
- Hayami, Yujiro (ed.), (1998), *Toward the Rural-Based Development of Commerce and Industry: Selected Experiences from East Asia*. Washington, DC: World Bank Economic Development Institute.
- Hayami, Yujiro, M. Kikuchi and Esther B. Marciano (1998), Structure of rural-based industrialization: Metal craft manufacturing on the outskirts of Greater Manila, the Philippines. *The Developing Economies*, Volume 36(2), pp. 132-154. <http://dx.doi.org/10.1111/j.1746-1049.1998.tb00214.x>
- Helliwell, John F. and Robert D. Putnam (1995), Economic growth and social capital in Italy. *Eastern Economic Journal*, Volume 21(3), pp. 295-307.
<http://www.jstor.org/stable/40325643>
- Henderson, J. V., Z. Shalizi and A. J. Venables (2001), Geography and development. *Journal of Economic Geography*, Volume 1(1), pp. 81-105.
<http://dx.doi.org/10.1093/jeg/1.1.81>
- Hofe, R. V. and Ke Chen (2006), Whither or not industrial cluster: Conclusions or confusions? *The Industrial Geographer*, Volume 4, Issue 1, pp. 2-28.
- Hofferth, S., J. Boisjoly and G. J. Duncan (1995), Do families 'invest' in social capital? Research Report No. 95-353, Population Studies Center, University of Michigan, Ann Arbor, Michigan.
- Humphrey, John and Hubert Schmitz (1996), The triple C approach to local industrial policy. *World Development*, Volume 24(12), pp. 1859-1877.
[http://dx.doi.org/10.1016/S0305-750X\(96\)00083-6](http://dx.doi.org/10.1016/S0305-750X(96)00083-6)
- Jaffe, A. B., M. Trajtenberg and R. Henderson (1993), Geographic localization of knowledge spillovers as evidenced by patent citations. *The Quarterly Journal of Economics*, Volume 108(3), pp. 577-598.
<http://dx.doi.org/10.2307/2118401>
- Jamshed, M. Khan and Javaid A. Ghani (2004), Clusters and entrepreneurship: Implications for innovation in a developing economy. *Journal of Developmental Entrepreneurship*, Volume 9(3), pp. 222-238.

- Kim, Phillip H., Howard E. Aldrich and Lisa A. Keister (2006), Access (not) denied: The impact of financial, human, and cultural capital on entrepreneurial entry in the United States. *Small Business Economics*, Volume 27(1), pp. 5-22. <http://dx.doi.org/10.1007/s11187-006-0007-x>
- Knorringa, P. (1999), Agra: An old cluster facing the new competition. *World Development*, Volume 27(9), pp. 1587-1604. [http://dx.doi.org/10.1016/S0305-750X\(99\)00070-4](http://dx.doi.org/10.1016/S0305-750X(99)00070-4)
- Krugman, P. (1991), *Geography and Trade*. Cambridge, MA: Massachusetts Institute of Technology Press.
- Landes, D. S. (1969), *The Unbound Prometheus*. Cambridge: Cambridge University Press.
- Langlois, Richard N. (2004), Chandler in a larger frame: Markets, transaction costs, and organizational form in history. *Enterprise and Society*, Volume 5(3), pp. 355-375.
- Langlois, Richard N. (2007), Dynamics of Industrial Capitalism: Schumpeter, Chandler, and the New Economy. London: Routledge.
- Lechner, C. and M. Dowling (1999), The evolution of industrial districts and regional networks: The case of the Biotechnology Region Munich/Martinsried. *Journal of Management and Governance*, Volume 3(4), pp. 309-338. <http://dx.doi.org/10.1023/A:1009928810007>
- Lechner, C. and M. Dowling (2003), Firm networks: External relationships as sources for the growth and competitiveness of entrepreneurial firms. *Entrepreneurship and Regional Development*, Volume 15(1), pp. 1-26. <http://dx.doi.org/1080/08985620210159220>
- Levy, B. (1990), Transaction costs, the size of firms and industrial policy: Lessons from a comparative case study of the footwear industry in Korea and Taiwan. *Journal of Development Economics*, Volume 34(1/2), pp. 151-178. [http://dx.doi.org/10.1016/0304-3878\(90\)90080-U](http://dx.doi.org/10.1016/0304-3878(90)90080-U)
- Levy, B. (1993), Obstacles to developing indigenous small and medium enterprises: An empirical assessment. *The World Bank Economic Review*, Volume 7(1), pp. 65-83. <http://dx.doi.org/10.1093/wber/7.1.65>
- Little, I. M. D. (1988), Small manufacturing enterprises and employment in developing countries. *Asian Development Review*, Volume 6(2), pp. 1-9.
- Mano, Y. and K. Otsuka (2000), Agglomeration economies and geographical concentration of industries: A case study of manufacturing sectors in Japan. *Journal of the Japanese and International Economics*, Volume 14(3), pp. 189-203. <http://dx.doi.org/10.1006/jjie.2000.0449>
- Marshall, A. (1920), *Principles of Economics: An Introductory Volume*. London: Macmillan.

- Martin, R. and P. Sunley (2003), Deconstructing clusters: Chaotic concept or policy panacea? *Journal of Economic Geography*, Volume 3(1), pp. 5-35.
<http://dx.doi.org/10.1093/jeg/3.1.5>
- McCormick, D. (1999), African enterprise clusters and industrialization: Theory and reality. *World Development*, Volume 27(9), pp. 1531-1551.
[http://dx.doi.org/10.1016/S0305-750X\(99\)00074-1](http://dx.doi.org/10.1016/S0305-750X(99)00074-1)
- Mead, Donald C. (1994), The contribution of small enterprises to employment growth in Southern and Eastern Africa. *World Development*, Volume 22(12), pp. 1881-1894. [http://dx.doi.org/10.1016/0305-750X\(94\)90180-5](http://dx.doi.org/10.1016/0305-750X(94)90180-5)
- Mead, Donald C. and C. Liedholm (1998), The dynamics of micro and small enterprises in developing countries. *World Development*, Volume 26(1), pp. 61-74. [http://dx.doi.org/10.1016/S0305-750X\(97\)10010-9](http://dx.doi.org/10.1016/S0305-750X(97)10010-9)
- Montgomery, James D. (1991), Social networks and labor-market outcomes: Towards an economic analysis. *The American Economic Review*, Volume 81(5), pp. 1408-1418. <http://www.jstor.org/stable/2006929>
- Morosini, P. (2004), Industrial clusters, knowledge integration and performance. *World Development*, Volume 32(2), pp. 305-326.
<http://dx.doi.org/10.1016/j.worlddev.2002.12.001>
- Mottaleb, Khondoker Abdul (2007), Human Capital and Industrial Development: The Case of the Knitwear Garment Industry in Bangladesh. Doctoral Thesis, National Graduate Institute of Policy Studies (GRIPS), Tokyo.
- Nabi, E. (1988), *Entrepreneurs and Markets in Early Industrialization: A Case Study from Pakistan*. San Francisco, CA: ICS Press.
- Nadvi, K. (1996), *Small Firm Industrial Districts in Pakistan*. Doctoral Thesis, Institute of Development Studies, University of Sussex.
- Nadvi, K. (1999a), The cutting edge: Collective efficiency and international competitiveness in Pakistan. *Oxford Development Studies*, Volume 27(1), pp. 81-107. <http://dx.doi.org/10.1080/13600819908424167>
- Nadvi, K. (1999b), Shifting ties: Social networks in the surgical instrument cluster of Sialkot, Pakistan. *Development and Change*, Volume 30(1), pp. 141-175.
<http://dx.doi.org/10.1111/1467-7660.00110>
- Nadvi, K. (1999c), Collective efficiency and collective failure: The response of the Sialkot surgical instrument cluster to global quality pressures. *World Development*, Volume 27(9), pp. 1605-1629.
[http://dx.doi.org/10.1016/S0305-750X\(99\)00078-9](http://dx.doi.org/10.1016/S0305-750X(99)00078-9)
- Nadvi, K. (2008), Global standards, global governance and the organization of global value chains. *Journal of Economic Geography*, Volume 8(3), pp. 323-343. <http://dx.doi.org/10.1093/jeg/lbn003>

- Nadvi, K. and H. Schmitz (1994), Industrial clusters in less developed countries: Review of experiences and research agenda. IDS Discussion Paper 339, Institute of Development Studies, University of Sussex, Brighton.
- Nam, Vu Hoang (2008), The Roles of Human and Social Capital in The Transformation of Village-Based Industrial Clusters: Evidence From Northern Vietnam. Doctoral Thesis, National Graduate Institute of Policy Studies (GRIPS), Tokyo.
- Nam, Vu Hoang, T. Sonobe and K. Otsuka (2009), An inquiry into the transformation process of village-based industrial clusters: The case of an iron and steel cluster in northern Vietnam. *Journal of Comparative Economics*, Volume 37(4), pp. 568-581. <http://dx.doi.org/10.1016/j.jce.2009.08.003>
- Nam, Vu Hoang, T. Sonobe and K. Otsuka (2010), An inquiry into the development process of village industries: The case of a knitwear cluster in northern Vietnam. *Journal of Development Studies*, Volume 46(2), pp. 312-330. <http://dx.doi.org/10.1080/00220380902952373>
- Nelson, Richard R. and E. S. Phelps (1966), Investment in humans, technological diffusion, and economic growth. *The American Economic Review*, Volume 56(1/2), pp. 69-75. <http://www.jstor.org/stable/1821269>
- OECD (2001), Knowledge and Skills for Life: First Results from PISA 2000. OECD.
- Otsuka, Keiji (2006), Cluster-based industrial development: A view from East Asia. *The Japanese Economic Review*, Volume 57(3), pp. 361-376. <http://dx.doi.org/10.1111/j.1468-5876.2006.00376.x>
- Peel, Michael J., N. Wilson and C. Howorth (2000), Late payment and credit management in the small firm sector: Some empirical evidence. *International Small Business Journal*, Volume 18(2), pp. 17-37. <http://dx.doi.org/10.1177/0266242600182001>
- Porter, M. (1990), *The Competitive Advantage of Nations*. New York: The Free Press.
- Porter, Michael E. (1998), Clusters and the new economics of competition. *Harvard Business Review*, Volume 76(6), pp. 77-90.
- Putnam, R. D. (2000), *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon and Schuster.
- Putnam, R. D. (2001), Social capital: Measurement and consequences. *Canadian Journal of Policy Research*, Volume 2(1), pp. 41-51.
- Rabellotti, R. (1995), Is there an "Industrial District Model"? Footwear districts in Italy and Mexico compared. *World Development*, Volume 23(1), pp. 29-41. [http://dx.doi.org/10.1016/0305-750X\(94\)00103-6](http://dx.doi.org/10.1016/0305-750X(94)00103-6)

- Rabellotti, R. (1997), *External Economies and Cooperation in Industrial Districts: A Comparison of Italy and Mexico*. London: Macmillan.
- Rabellotti, R. (1999), Recovery of Mexican cluster: Devaluation bonanza or collective efficiency? *World Development*, Volume 27(9), pp. 1571-1585.
[http://dx.doi.org/10.1016/S0305-750X\(99\)00071-6](http://dx.doi.org/10.1016/S0305-750X(99)00071-6)
- Romer, Paul M. (1986), Increasing returns and long run growth. *Journal of Political Economy*, Volume 94(5), pp. 1002-1037. <http://www.jstor.org/stable/1833190>
- Romer, Paul M. (1989), Human capital and growth: Theory and evidence. NBER Working Paper No. 3173. National Bureau of Economic Research, Cambridge.
- Romer, Paul M. (1990), Endogenous technological change. *Journal of Political Economy*, Volume 98(5), pp. 71-102. <http://www.jstor.org/stable/2937632>
- Rosenfeld, S. A. (1995), *Industrial Strength Strategies: Regional Business Cluster and Public Policy*. Washington, DC. The Aspen Institute.
- Rosenthal, Stuart S. and W. C. Strange (2001), The determinants of agglomerations. *Journal of Urban Economics*, Volume 50(2), pp. 191-229.
<http://dx.doi.org/10.1006/juec.2001.2230>
- Ruan, Jianqing and Xiaobo Zhang (2009), Finance and cluster-based industrial development in China. *Economic Development and Cultural Change*, Volume 58(1), pp. 143-164. <http://www.jstor.org/stable/10.1086/605208>
- Saito, Katrine A. and D. P. Villanueva (1981), Transaction costs of credit and the small-scale sector in the Philippines. *Economic Development and Cultural Change*, Volume 29(3), pp. 631-639. <http://www.jstor.org/stable/1153713>
- Saxenian, A. (1994), *Regional Advantage, Culture and Competition in Silicon Valley and Route 128*. Cambridge: Harvard University Press.
- Schmitz, H. (1992), On the clustering of small firms. *IDS Bulletin*, Volume 23(3), pp. 64-69. <http://dx.doi.org/10.1111/j.1759-5436.1992.mp23003012.x>
- Schmitz, H. (1995a), Small shoemakers and fordist giants: Tale of a super-cluster. *World Development*, Volume 23(1), pp. 9-28.
[http://dx.doi.org/10.1016/0305-750X\(94\)00110-K](http://dx.doi.org/10.1016/0305-750X(94)00110-K)
- Schmitz, H. (1995b), Collective efficiency: Growth path for small-scale industry. *Journal of Development Studies*, Volume 31(4), pp. 529-566.
<http://dx.doi.org/10.1080/00220389508422377>
- Schmitz, H. (1999a), Collective efficiency and increasing returns. *Cambridge Journal of Economics*, Volume 23(4), pp. 465-483.
<http://dx.doi.org/10.1093/cje/23.4.449>
- Schmitz, H. (1999b), Global competition and local cooperation: Success and failure in the Sinos Valley, Brazil. *World Development*, Volume 27(9), pp. 1627-1650.
[http://dx.doi.org/10.1016/S0305-750X\(99\)00075-3](http://dx.doi.org/10.1016/S0305-750X(99)00075-3)

- Schmitz, H. and Khalid Nadvi (1999), Clustering and industrialization: Introduction. *World Development*, Volume 27(9), pp. 1503-1514.
[http://dx.doi.org/10.1016/S0305-750X\(99\)00072-8](http://dx.doi.org/10.1016/S0305-750X(99)00072-8)
- Schrader, Stephan (1991), Informal technology transfer between firms: Cooperation through information trading. *Research Policy*, Volume 20(2), pp. 153-170.
[http://dx.doi.org/10.1016/0048-7333\(91\)90077-4](http://dx.doi.org/10.1016/0048-7333(91)90077-4)
- Schumpeter, J. A. (1912), *The Theory of Economic Development*. New York: Oxford University Press.
- Simon, Curtis J. and John T. Warner (1992), Matchmaker, matchmaker: The effect of old boy networks on job match quality, earnings, and tenure. *Journal of Labor Economics*, Volume 10(3), pp. 306-330.
<http://www.jstor.org/stable/2535091>
- Sonobe, T. and K. Otsuka (2006), *Cluster-Based Industrial Development: An East Asian Model*. Basingstoke: Palgrave Macmillan.
- Sonobe, T. and R. M. Briones (2001), The Role of Urban-Rural Subcontracting in Rural Industrialization: A Case Study of the Export-oriented Garment and Metal Craft Industries in the Philippines. Tokyo Metropolitan University, Faculty of Economics, Unpublished Manuscript.
- Sonobe, T., D. Hu and K. Otsuka (2002), Process of cluster formation in China: A case study of a garment town. *Journal of Development Studies*, Volume 39(1), pp. 118-139. <http://dx.doi.org/10.1080/00220380412331322691>
- Sonobe, T., D. Hu and K. Otsuka (2004), From inferior to superior products: An inquiry into the Wenzhou Model of industrial development in China. *Journal of Comparative Economics*, Volume 32(3), pp. 542-563.
<http://dx.doi.org/10.1016/j.jce.2004.05.001>
- Sonobe, T., J. E. Aketon and K. Otsuka (2009), An exploration into the successful development of the leather-shoe industry in Ethiopia. *Review of Development Economics*, Volume 13(4), pp. 719-736.
<http://dx.doi.org/10.1111/j.1467-9361.2009.00526.x>
- Sonobe, T., M. Kawakami and K. Otsuka (2003), Changing roles of innovation and imitation in industrial development: The case of the machine tool industry in Taiwan. *Economic Development and Cultural Change*, Volume 52(1), pp. 103-128. <http://dx.doi.org/10.1086/380105>
- Storey, D. J. (1994), *Understanding the Small Business Sector*. London: Routledge.
- Swann, P. and M. Prevezer (1996), A comparison of the dynamics of industrial clustering in computing and biotechnology. *Research Policy*, Volume 25(7), pp. 1139-1157. [http://dx.doi.org/10.1016/S0048-7333\(96\)00897-9](http://dx.doi.org/10.1016/S0048-7333(96)00897-9)

- Tewari, M. (1999), Successful adjustment in Indian industry: The case of Ludhiana's woolen knitwear cluster. *World Development*, Volume 27(9), pp. 1651-1671. [http://dx.doi.org/10.1016/S0305-750X\(99\)00079-0](http://dx.doi.org/10.1016/S0305-750X(99)00079-0)
- Weijland, H. (1999), Microenterprises clusters in rural Indonesia: Industrial seedbed and policy target. *World Development*, Volume 27(9), pp. 1515-1530. [http://dx.doi.org/10.1016/S0305-750X\(99\)00076-5](http://dx.doi.org/10.1016/S0305-750X(99)00076-5)
- Yamamura, E., T. Sonobe and K. Otsuka (2003), Human capital, cluster formation, and international relocation: The case of garment industry in Japan, 1968-98. *Journal of Economic Geography*, Volume 3(1), pp. 37-56. <http://dx.doi.org/10.1093/jeg/3.1.37>
- Yamamura, E., T. Sonobe and K. Otsuka (2005), Time paths in innovation, imitation, and growth: The case of the motorcycle industry in postwar Japan. *Journal of Evolutionary Economics*, Volume 15(2), pp. 169-186. <http://dx.doi.org/10.1007/s00191-004-0239-3>