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Introduction: The Scope and Significance of the Study

1.1 Why focus on industrial clusters?

Wide-spread and persistent poverty in the majority of developing countries is one of the most serious issues currently facing the world. In order to reduce poverty, ample employment opportunities must be created for the poor. To achieve this, the development of labor-intensive industries is the key, as agriculture can provide only limited employment opportunities and the service sector can only become the leading sector in the later stage of economic development. Indeed, although the Green Revolution in Asia increased grain production dramatically, it had the modest effects on labor demand (David and Otsuka 1994). As a result, it was not an increased labor employment opportunity in agriculture but in non-agricultural sector that directly contributed to the poverty reduction in Asia (Otsuka, *et al.*, 2009). In our observation, the service sector cannot be an engine of growth in low-income economies, because major innovations in this sector are knowledge-intensive and labor-saving, which are not appropriate for unskilled labor-abundant low-wage economies. Consequently, the

central question is how to promote the development of labor-intensive industries in such countries.

The commonly accepted neoclassical presumption is that “industrial policy” does not work, and thus governments have to do little to promote industrial development beyond the provision of infrastructure such as roads, electricity, and communication systems. This presumption is incorrect, however, because there are several important sources of market failure which governments can address. First, transaction costs between manufacturing enterprises (e.g., assemblers and parts-suppliers) and between such enterprises and traders are known to be high, particularly in developing countries. Due to asymmetric information and imperfect contract enforcement, adverse selection, cheating, and hold-ups may occur, thus negatively affecting the functioning of the market (e.g., Akerlof, 1970; Williamson, 1985; Hart and Moore, 1990). Second, innovative knowledge spills over, as is emphasized in the endogenous growth literature (e.g., Romer, 1986). Such knowledge is often tacit and, hence, not patentable or tradable, and thus the markets would not work in this case. The result is under-investment in the creation of new productive ideas. Third, in the recent literature, the importance of managerial capital and management practices to firm performance is being reevaluated (Bloom and Van Reenen, 2007, 2010; Bruhn *et al.*,

2010; Syverson, 2010).¹ Sonobe and Otsuka (2006) revealed that entrepreneurs' managerial human capital plays a critical role in industrial development, as it affects the innovation. As with ordinary human capital, investment in managerial human capital is likely to be socially sub-optimal due to inaccessibility to finance. This problem is exacerbated by information spillovers, which thwart the incentive to innovate (Arrow, 1962). Thus, there is clearly room for government intervention to promote industrial development through the correction of such market failures.²

In our observations, most, if not all, of the indigenously developed industries in low-income countries are cluster-based, in which a number of small and medium enterprises producing similar and related products are located in a small neighborhood. Huang and Bocchi (2008) and Schmitz and Nadvi (1999), as well as many other studies, report that there are a large number of industrial clusters in East and South Asia and Latin America. Even in sub-Saharan Africa (SSA), such industrial clusters are ubiquitous (e.g., McCormick, 1999). Examples are the shoe, garment, furniture, woodwork, and metalwork clusters. Since the majority of enterprises in the indigenously developed industrial clusters are unregistered informal enterprises, their presence is grossly underestimated. Such clusters attract enterprises as they reduce the transaction costs between manufacturing enterprises and between manufacturers and

traders.³ Indeed within the cluster, the asymmetric information about the trustworthiness of potential trading partners is not as serious as outside the cluster because people in the cluster become well acquainted and regularly exchange information about the personality and conduct of other entrepreneurs and traders within the same cluster. Under such conditions, dishonest behavior is likely to be detected and heavily punished, and thus the temptation to behave dishonestly tends to be suppressed. As a result, market transactions are promoted. Given this scenario, the government may support the formation of industrial clusters by investing in industrial zones and marketplaces, as has been done actively by various levels of government in China (Sonobe *et al.* 2002, 2004; Ding, 2007; Ruan and Zhang, 2009).

Information spillover or imitation is rampant in industrial clusters. Visual inspection and reverse engineering of the new products of rival enterprises, poaching knowledgeable workers from rivals, and the acquisition of confidential technological information from a rival's parts-suppliers are common methods of imitation. Patent protection of technological information is effective only for a limited set of knowledge. Moreover, managerial knowledge, which is at least as important as technological knowledge, cannot be patented. As a result, the social return to creating and introducing new knowledge, which encompasses the development of new superior

products, production methods, marketing channels, and internal management systems, exceeds the private return, resulting in a socially sub-optimal level of investment in new innovative knowledge, if left to free market forces. Thus, governmental support for innovation may be warranted, as in the case of the Industrial Technology Research Institute in Taiwan, which facilitated the import of foreign technologies by means of adaptive research and training (Hong and Gee, 1993). Note that “innovation” here refers to “imitative innovation” or “improvement” but not to the “innovation” that leads to creative destruction in the sense of Schumpeter (1950).

In order for an enterprise to grow, its manager must be an entrepreneur, who constantly strives for new innovations. To become a dynamic entrepreneur, the manager must invest in his/her managerial human capital; however, insufficient financial resources may preclude this. Even if the manager possesses sufficient resources, he or she may not know where to invest or what to learn. Moreover, to the extent that new knowledge can be imitated by others, the private return to human capital investment may be miniscule compared with the social return. Indeed we found that the majority of small entrepreneurs in SSA operate their businesses without realizing whether they are making profits or losses because they do not keep records of the costs of and revenues from their various production activities. It seems to us that gross

under-investment in managerial human capital is a major constraint on efficient enterprise management in low income countries. Here too, there is ample room for productive support by the government.

Although not unique to the development of industrial clusters, another area where the government can potentially play a critical role is the provision of low-interest loans due to the mal-functioning of credit markets (e.g., Beck *et al.*, 2009; Karlan and Morduch, 2009). While we agree with this basic argument, we would also like to point out that successfully grown enterprises were rarely dependent on subsidized credit in East Asia, particularly in the early stage of development when low-quality products are produced (Sonobe and Otsuka 2006). In addition, there is always the risk of providing cheap credit to non-innovative and non-promising enterprises. We believe that a socially productive credit policy provides credit only to those enterprises which have established a record of successful innovations.

In sum, the facts that so many industries in developing countries are clustered, even though government does not provide any support, and that there are potentially useful roles to be played by the government warrant the careful empirical studies of the cluster-based industrial development.

1.2 Causes of growing and stagnating clusters

Why has SSA largely failed to develop dynamically growing industrial clusters? Is it possible to promote industrial development in this region? If so, what is the appropriate development strategy? These were the issues we raised when we completed our earlier research project on cluster-based industrial development in East Asia, which compares the growth experience of eight industrial clusters in Japan, Taiwan, and China (Sonobe and Otsuka, 2006). The surprising result of our East Asian study is that there are large similarities in the pattern of *successful* cluster-based industrial development across industries and across the three East Asian countries, which is summarized in Table 1.1.

If the production method is simple but it is not easy to sell the product, as in the case of the garment and shoe industries, it is likely to be traders who establish new enterprises to initiate a new industry. Taking advantage of their experience in commercial activities in other industries, they undertake production in the suburbs of large cities or villages not too far away from large cities, as the access to large markets is critically important.⁴ If the production method is complicated, engineers tend to be the new entrepreneurs who play a critical role in initiating a new industry. Since they tend to reside in cities and their suburbs, this type of industries tends to be born in

urbanized areas. By and large these pioneering entrepreneurs imitate foreign technologies; but the imitation is not a simple task, as the materials, parts, and skilled workers available in advanced countries are often unavailable in developing countries. Thus, a pioneer of new industry makes a great deal of efforts to establish new production methods. Once established, the pioneer receives sizable entrepreneurial profits, despite the low quality of their products, because of large demand for such products by poor consumers.

In our observations, following the initiation of a new profitable business by a pioneer, a swarm of imitators, who produce the same low-quality products by using the same low-quality inputs as the pioneer, enters the industry and sells their products on the same local markets. In this way, an industrial cluster is formed, as is illustrated in Figure 1.1. Because of the “excessive” entry of new enterprises, however, the supply of products exceeds the demand, resulting in lower product prices and declining profitability in this quantity expansion phase. This triggers competition based around the improvement of the quality of the products. It is important to note that although productivity growth is slow in the quantity expansion phase, the expansion of the size of market induces the division of labor between assemblers and part-suppliers (Stigler, 1951; Ruan and Zhang, 2009), and attracts traders, engineers, and designers. The

availability of such human resources sets the stage for innovations, which are nothing but “recombination of existing resources” to use the expression of Schumpeter (1912).

The success of the quality improvement requires the use of high-quality parts and materials, and the employment of more experienced and skilled workers, so that the cost of production increases. More often than not, however, consumers do not immediately perceive the quality improvement, so that the new products cannot command high prices in the market. Thus, how to convey the quality information to consumers is the key issue that the innovative entrepreneur must resolve. Commonly the establishment of brand names and the development of new direct marketing channels such as operation of own shops and direct sales to wholesalers, supermarkets, and department stores, are critical development strategies. The establishment of trust-based long-term subcontracting relationships with parts-suppliers becomes also important, as the new products often require differentiated parts and components, which embody new ideas. In addition, stricter control of product quality and monitoring of worker must be implemented. Successful quality improvement leads to the dramatic development of the industry with a smaller number of much larger enterprises, partly because non-innovative enterprises are forced to exit and partly because innovative enterprises expand their scale of operation (see solid curves in Figure 1.1). Once these

multi-faceted improvements of production methods and enterprise management are carried out successfully, large innovative enterprises emerge and they often export their improved products to high income countries.

We called this development pattern the “East Asian Model of Cluster-Based Industrial Development” (Sonobe and Otsuka, 2006). A question arises, however, as to whether such a development pattern is really unique to East Asia. Thus, we have since undertaken case studies of village-based garment and steel-bar clusters in Vietnam, of the spectacularly developed and exceedingly large garment cluster in Bangladesh, and of the steadily growing electrical fittings cluster in Pakistan. Although differences exist in the development pattern among the four cases and between these cases and those in East Asia studied earlier, much more striking is the similarities. Thus, we concede that the “East Asian Model” is a misnomer.

To our surprise, there are a large number of industrial clusters formed by micro, small, and medium-size enterprises in SSA, even though most of them fail to grow.⁵ We conducted case studies of the small-scale garment cluster and metalwork cluster in Nairobi, Kenya, and of the export-oriented garment cluster supported by the government and the rapidly growing leather shoe cluster in Addis Ababa, Ethiopia. A clear similarity between Asia and Africa is found in the pattern of cluster formation. In

both Asia and SSA, the cluster is formed by the massive entry of imitators, including spin-offs.

A major dissimilarity between Asia and SSA is observed in the occurrence or absence of multifaceted innovations. Unlike Asia, multi-faceted improvements seldom take place in SSA. Thus, as is indicated by dotted curves in Figure 1.1, the number of enterprises continue to increase and, hence, the profitability continues to decline. In this respect, the industrial clusters in Asia have an advantage over those in SSA because the former can learn a great deal from the experience of successfully grown clusters in neighboring countries. The leather shoe cluster in Ethiopia is exceptional. It has been growing rapidly due to the introduction of multi-faceted improvements in the quality of products, marketing, and internal management – a development pattern similar to the “East Asian Model.” This case vividly illustrates that the same pattern of cluster development seen in Asia is possible in SSA.

1.3 In Search for key growth drivers

The ultimate purpose of this study is to identify the essential determinants of the occurrence and absence of multifaceted innovations or improvements, which is the engine of the sustained growth of industrial clusters, with a view to drawing

implications for designing effective industrial development policies. In order to carry out such innovations, the managerial human capital, which is represented by schooling and work experience of enterprise managers, plays a critical role in Japan, Taiwan and China. Also often important is the experience of managers in marketing business as traders or as a staff of marketing division of large enterprise, because marketing knowledge is an integral part of the managerial human capital. Thus, we would like to test the following hypothesis based on the case studies outside of these three East Asia countries:

Hypothesis 1: *The managerial human capital of enterprise managers is the major determinant of successful multi-faceted innovations.*

Traders, particularly local traders, contribute to the quantity expansion of industrial clusters by reducing marketing costs for clustered enterprises. In addition, as was discussed before, improved marketing is a prerequisite for the successful quality improvement of products because consumers do not immediately perceive the quality improvement. Thus, in China and Japan, successful entrepreneurs themselves were often traders, who are adept at marketing (Sonobe and Otsuka 2006). Urban and foreign traders often bring about new production methods, improved marketing knowledge, and high-quality parts and materials, thereby assisting the multifaceted

innovation in industrial clusters. Thus, it is worth testing the following hypothesis:

Hypothesis 2: *Traders plays a critical role not only in facilitating marketing of low-quality products during the quantity expansion phase but also in assisting the production of upgraded products and supply of high-quality parts and materials, thereby improving of the performance of enterprises in an industrial cluster.*

Note, however, that as the quality improvement proceeds further, the role of traders tends to decline due to the increasing efforts of marketing by large, successfully innovative enterprises, according to the experience of Northeast Asia (Sonobe and Otsuka, 2006).

One advantage of low-income countries is the ample possibility of imitating technological and managerial knowledge from abroad. Although concrete statistical evidence is scarce, there is no question that all the high-performing countries in East Asia, including Japan and China, have grown rapidly based on such imitation from more advanced countries (Hamada *et al.*, 2011). Thus, we would like to postulate the following hypothesis:

Hypothesis 3: *The key to successful multi-faceted innovations is successful international knowledge transfer.*

Under what conditions, then, are potential entrepreneurs motivated to undertake

multi-faceted innovations? As previously mentioned, according to Sonobe and Otsuka (2006), the rapidly increasing supply of low-quality products by a large number of clustered enterprises leads to lower product prices and declining profits, factors that stimulate the potential entrepreneurs to undertake multi-faceted innovations. Aside from the reduction in product prices due to enhanced domestic competition, the prices of manufactured products in many developing countries have fallen because of the massive import of cheap Chinese products, what may be termed the China shock. The question is whether such an exogenously created reduction in product prices due to the China shock also leads to the stimulation of multi-faceted innovations. The answer may vary from case to case. Yet, we found two cases in which the China shock has stimulated multi-faceted innovations, i.e., the electrical fittings industry in Pakistan and the leather shoe industry in Ethiopia. In accordance with Hypotheses 1 to 3, we postulate that managerial human capital, traders, and knowledge transfer from advanced countries play important roles in realizing the multi-faceted innovations. In contrast, the garment cluster in Nairobi, which has failed to innovate, has been unable to compete with the imported Chinese products. We believe that this failure can be attributed to the weak managerial human capital, trading experience, and the knowledge transfer.

If multi-faceted innovations are the key to success in industrial development,

governmental support for industrial development without concurrent support for such innovations is bound to fail. More specifically, we would like to argue that the provision of subsidies and other support measures without support for innovations will not lead to the successful development of clustered enterprises. This implies that the support for the accumulation of managerial human capital leads to the successful development of clusters.

While Hypotheses 1 to 3 formulated in this chapter represent fundamental propositions in this study, we will also specify more directly testable specific hypotheses in subsequent chapters. Our strategy is to prove or disprove Hypotheses 1 to 3 by implementing rigorous tests of a large number of specific hypotheses.

1.4 Scope of the study

First of all, we would like to demonstrate the importance of reducing the cost of transaction between manufacturers and traders in the development of an industrial cluster by undertaking case studies of garment clusters in Vietnam and Kenya in Part I of this book. It is shown that overseas Vietnamese traders facilitated the export of garment products from the cluster in northern Vietnam, which critically affected the enterprise performance, whereas bulk purchase of products by petty traders assisted the

expansion of the size of garment enterprises in Kenya. These are supportive of Hypothesis 2 and consistent with the earlier findings by Sonobe and Otsuka (2006) that the development of industrial clusters whose products are easy to produce but difficult to sell, such as the garment industry, is trader-led.

Second, we would like to show the importance of managerial human capital by examining the cases of a metal-bar cluster in Vietnam and a metalwork cluster in Kenya in Part II. It is demonstrated that the schooling and work experience of enterprise managers, including prior experience of trading, are key determinants of upgrading products, marketing, and enterprise management, which supports Hypothesis 1. It is also important to note that some of the former micro informal enterprises have moved to industrial zones and become formal and larger enterprises in Kenya, after they succeeded in the multi-faceted innovations. It is therefore a mistake to assume that micro and small enterprises in SSA never become large.

We would like to highlight the importance of the multi-faceted innovations in the face of fierce competition with the flood of cheap Chinese products in the context of the electrical fittings industry in Pakistan and the leather shoe cluster in Ethiopia in Part III. We show that China Shock can be overcome by multifaceted innovations based on technology transfers from advanced countries, which is consistent with Hypothesis 3.

Finally, we will examine the consequences of contrasting industrial development strategies, i.e., the strategy to support innovation by introducing production and management knowledge from abroad in the garment cluster in Bangladesh and the policy to provide financial support and preferential treatment without an emphasis on innovations in the garment cluster in Ethiopia in Part IV. The results are supportive of our arguments for the critical importance of the strategy to support the investment in the accumulation of managerial human capital and learning of technology and management from abroad.

Thus, based on our case studies, clear policy implication emerges: Support for investment in the managerial human capital of enterprise managers should be provided so as to facilitate the absorption of technological and managerial knowledge from abroad and to strengthen the marketing ability of the enterprises. In addition, we would like to argue that the government should support cluster-based industrial development by constructing such key infrastructures as industrial zones and marketplaces and also by improving access to credit for innovative enterprises, which are able to allocate such credit to truly profitable investment projects.

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Table 1.1 An endogenous model of cluster-based industrial development

Phase	Prior experience of managers	Education	Innovation, imitation, and productivity growth	Institutions
Initiation	Traders/engineers	Low	Imitation of foreign technology, production of low-quality products	Internal production of parts, components, and final products
Quantity expansion	Spin-offs and entry from various fields	Mixed	Entry of a number of followers, imitation of imitated technologies, and stagnant productivity	Gradual development of market transactions, and formation of industrial cluster
Quality improvement	Second-generation of founders and now comers with new ideas	Very high	Multi-faceted innovations, exit of non-innovative enterprises, and increasing productivity and export	Reputation and brand names, direct sales, sub-contracts or vertical integration, and emergence of large enterprises

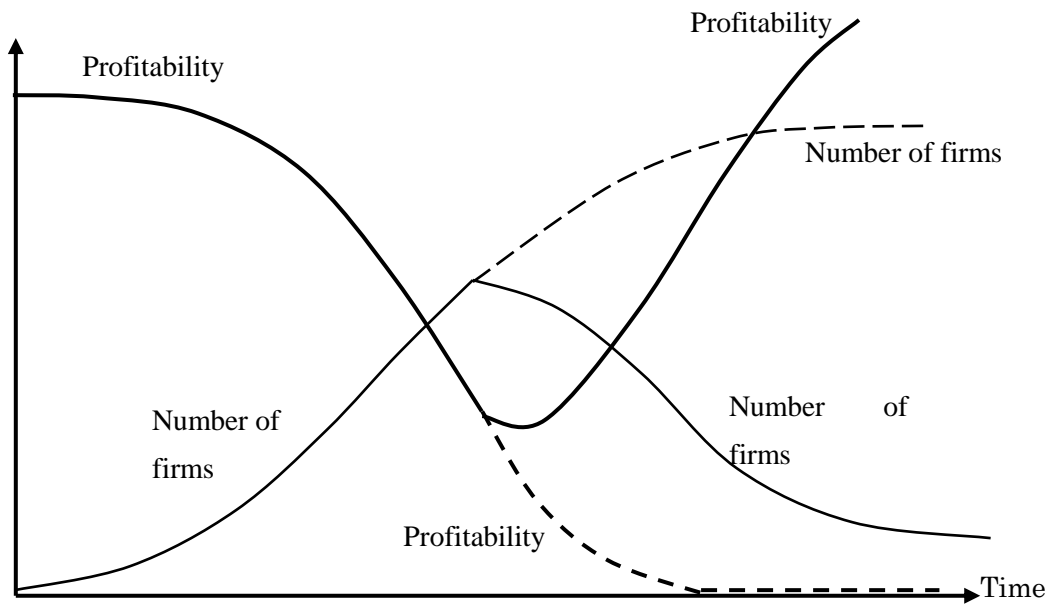


Figure 1.1 An illustration of development patterns of industrial clusters in terms of changing profitability and the number of firms