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Introduction

How to develop industries was the main issue in development economics in the 1950s and 1960s, when this new branch of economics was being established. For example, criticizing Rosenstein-Rodan's (1943) influential "Big Push" or "Balanced Growth" theory, Hirschman (1958) proposed the strategy of focused or "unbalanced" industrialization based on his pioneering analysis of forward and backward linkages among industries. Lewis (1954) and later Fei and Ranis (1964) formulated a model of industrialization which is based upon the transfer of labor force from agriculture to industries. As a comprehensive review of the early literature on industrialization by Sutcliffe (1971) clearly attests to, the issue of industrialization was heatedly and widely debated among a large number of economists and other social scientists. The excitement about this issue, however, quickly faded away in the 1970s, with a major exception being the issue of the appropriate technology or the choice of optimum technology by developing countries from the "shelf" of available technologies in developed countries (Stewart 1978; White 1978). This issue, too, lost momentum shortly thereafter. As a result, the discussion of industrialization occupies only a small space in modern textbooks of development economics.¹

We believe that the development of labor-intensive industries is essential to reduce poverty in low-income countries. It is true that agricultural development is also

¹ See, for example, Bardhan and Udry (1999) and Hayami and Godo (2005). The Big Push theory was revived and given a formal model by Murphy, Shleifer, and Vishny (1989), and attempts to formulate the dynamic process of industrialization have been made by Matsuyama (1991), Ciccone and Matsuyama (1996), among others. Still, industrialization is outside the purview of the vast majority of development studies.

indispensable to reduce poverty, simply because overall economic development is infeasible without agricultural development in poor economies where agriculture dominates. According to the experience of the Asian Green Revolution, however, technological progress in agriculture enhances food supply significantly, thereby reducing food insecurity, but not employment opportunities (David and Otsuka 1994). Furthermore, it has become increasingly clear that rural poverty declines primarily through increases in non-farm incomes but not in farm incomes (e.g., Estudillo and Otsuka 1999; Hayami and Kikuchi 2000). Thus, it is obvious that in order to reduce poverty and to achieve equitable and sustainable development, we have to develop industries that provide enhanced employment opportunities for the poor.

Particularly important for employment generation are industrial clusters consisting of a large number of small- and medium-sized enterprises (SMEs), whose typical products include shoes, garments, furniture, and metalwork (Altenburg and Meyer-Stamber 1999; Giuliani, Pietrobelli, and Rabellotti 2005). In terms of employment generation, these clusters are by far the most important manufacturing sectors in many developing countries. In our view, the early literature on industrialization has failed to offer an effective industrialization strategy, because of a sheer lack of careful empirical studies describing and diagnosing the reality and possibility of industrialization at the grass-roots level, including the development of industrial clusters. The dialogue between theories and empirical facts was also weak. The present study attempts to undertake careful empirical studies in selected industrial clusters in East Asia, where the cluster-based development has been particularly successful, and to develop a theory of “endogenous industrial development,” with a view to designing a new strategy to foster industrialization in developing countries.

Another characteristic of this study is the explicit focus on the role of markets in industrialization. By now we know that asymmetric information and incomplete contracting increase transaction costs (Williamson 1985; Milgrom and Roberts 1992). Information is particularly imperfect in a dynamic setting that entails new changes, which are inherently uncertain, such as the use of new materials, the production of new parts, the commencement of transactions with new partners, and the adoption of new production methods. In such a setting, markets are likely to fail in efficient resource allocation, unless they are supported by some institutional means. Hayami (1998, 2001), Hayami and Godo (2005), and Hayami and Kawagoe (1993) argue that the community mechanism of contract enforcement based on mutual trust and long-enduring personal relationships plays an important role in reducing transaction costs and supporting market transactions in the context of rural communities in developing countries.²

Considerable efforts to reduce transaction costs are also made by merchants and industrialists. According to the biography of Konosuke Matsushita, the founder of the Matsushita Electric Company, as soon as he succeeded in developing improved and differentiated products, he introduced the brand name, *National*, and the sale of his products through the newly established network of retailers exclusively selling his products (Kotter 1997). Branding and direct sales seem to be common methods of reducing transaction costs arising from asymmetric information about the quality of products. Indeed, we have repeatedly observed that so many entrepreneurs adopted these methods in Japan, Taiwan, and China. Such observations suggest that

² Hayami and Otsuka (1993) argue that such a mechanism reduces shirking of share tenants, known as the Marshallian inefficiency, to a significant extent.

entrepreneurs devise a variety of methods for reducing different types of transaction costs and, consequently, mitigating market failures in the real world. We would like to argue that the basis for formulating an effective strategy to develop industries is to identify the potential sources of market failure and the counteracting efforts of entrepreneurs to reduce.

What are the institutional mechanisms in industrialization that can play the role of rural communities in enforcing market transactions? Our answer is the industrial cluster. Owing to the geographical proximity of enterprises, information about their technological capacities, marketing behaviors, and the conduct and personality of enterprise managers is public knowledge within a cluster. If an enterprise commits cheating, e.g., sale of fake commodities, it will quickly and widely be known by enterprises and merchants in the cluster, which reduces the reputation of the malfeasant. With reduced reputation, this enterprise will lose customers and eventually face the crisis of bankruptcy. Morosini (2004) characterizes industrial clusters as “social communities.” One of the central hypotheses of this study is that industrial clusters facilitate market transactions by reducing transaction costs.

Effective market transactions alone cannot ensure the sustainable development of industries: it requires innovations in technology, marketing, and production organization. Because of the paucity of solid empirical studies of innovations in developing countries, however, we do not know the answers to even such simple and fundamental questions on innovations as what types of entrepreneurs initiate new industries and introduce new ideas, and under what conditions major innovations are likely to take place. Our hypothesis is that the industrial cluster enlarges opportunities to innovate, because it attracts a variety of human resources, such as designers, engineers, part-suppliers, and

merchants. Diverse human resources are needed for what we call the “multifaceted innovations” to take place in the cluster. First of all, an entrepreneur must employ competent designers, engineers, and researchers to improve the quality of products. Secondly, in order to convey the quality information to consumers effectively, the entrepreneur must establish brand names and new direct marketing channels, such as networks of own sales agents and own retail shops. Thirdly, in order to produce new differentiated products, the entrepreneur must be able to acquire new differentiated parts from dependable part-suppliers. All these new changes can take place simultaneously in the industrial cluster, owing to the availability of diverse human resources.

In order to substantiate these hypotheses, we undertook informal surveys of enterprises followed by formal surveys inquiring about production, technologies, transactions of parts and final products, and the personal histories of enterprise managers. Using such primary data, we attempt to shed new light on the relationships between innovation and imitation, the process of the formation of industrial clusters, the personality of entrepreneurs who initiate new industries and undertake innovations, and the institutional mechanisms supporting industrial development. We use the term “industrial development” rather than “industrialization.” The former term has a wider connotation which covers not only the improvement and expansion of industrial production but also those of the procurement of parts, materials, and desired skilled workers as well as the successful sales of final products. Thus, industrial development fits the scope of our analysis.

In order to gain insights into the East Asian model of cluster-based industrial development, we decided to make a pair-wise comparison of the same or similar industries in two of the three East Asian countries characterized by vastly different

political regimes and stages of economic development: (1) the garment clusters in Hiroshima prefecture in Japan and Zhejiang province in China (Yamamura, Sonobe, and Otsuka 2003, Sonobe, Hu, and Otsuka 2002); (2) the motorcycle industry in Japan in comparison with Chongqing in China (Yamamura, Sonobe, and Otsuka 2005; Sonobe, Hu, and Otsuka 2006), (3) the machine tool industry in Taichung, Taiwan, and the low-voltage electric machinery industry in Wenzhou, China (Sonobe, Kawakami, and Otsuka 2003; Sonobe, Hu, and Otsuka, 2004); and (4) the printed circuit board industry in northern Taiwan and Jiangsu province in China. The results of these case studies are integrated and reported in Chapters 4 to 7.³

In this chapter, we review and synthesize the existing bodies of literature relevant to the exploration of cluster-based industrial development in developing countries. After clarifying the advantages of industrial clusters in the next section, we review in the subsequent four sections the literature on economic geography, empirical studies of industrial clusters, globalization and industrial clusters, and the theory of product life cycle. In the final section, we attempt to synthesize the existing literature and clarify important areas of research towards the establishment of the “East Asian Model of Industrial Development.”

1.1 Roles of Industrial Clusters

We define an industrial cluster as the geographical concentration or localization of enterprises producing similar or closely related goods in a small area. Throughout this study, we use this simple definition of industrial clusters, which is consistent with the

³ We employed rigorous statistical techniques to test a number of empirical hypotheses. For those who are not interested in the technical details of the statistical estimation, we summarize the major findings at the end of the section on the empirical analysis.

definitions adopted in the literature on business economics, innovation studies, and development economics. For example, Porter (1990, p.18) defines clusters as “geographic concentrations of interconnected companies and institutions in a particular field.” Swann, Prevezer, and Stout (1998, p. 1) define a cluster as “a large group of firms in related industries at a particular location.” A special issue of *World Development* on clustering and industrialization uses a definition of industrial clusters as “sectoral *and* spatial concentrations of firms” (Schmitz and Nadvi 1999).

Since the seminal work of Marshall (1920), three major advantages of industrial clusters have conventionally been recognized: (1) information spillovers, (2) the specialization and division of labor among enterprises, and (3) the development of skilled labor markets. While we do not have major objections to the importance of these three advantages, our analysis suggests that there is room for further elaborations. We fully agree that information spillovers are common and important in any industrial cluster. For example, in the garment clusters in both Japan and China (Chapter 4), if a new design introduced by an enterprise turns out to be popular, many other enterprises copy it within a few days. But information spillovers, which are essentially imitation, are not always that simple. In our observation, less simple imitation takes place through spin-offs and the poaching of skilled workers and managers from other enterprises.⁴ The details and implications for the industrial development of such imitation are discussed in our case studies on the motorcycle industry in Chongqing (Chapter 5), the machine tool industry in Taichung (Chapter 6), and the printed circuit board industries in Taiwan and Suzhou in China (Chapter 7).⁵ Thus, information

⁴ This observation supports the assumptions made by Jovanovic and Rob (1989), Jovanovic and Nyarko (1995), and Glaeser (1999) in their theoretical models of skill transmission.

⁵ Particularly interesting is the finding reported in Chapter 7 that a group of spin-off enterprises

spillovers in the industrial cluster are inseparably related with the development of skilled labor markets, because the latter enhances knowledge diffusion and skill transmission through spin-offs and active labor turnover.

Information spillovers take place also through the transaction of intermediate inputs between parts suppliers and assemblers because parts embody production technologies. Thus, the transaction of parts enhances the standardization of products, parts, and production processes. According to our respondents in the motorcycle and machinery industries (Chapters 5 and 6), assemblers of new differentiated products develop long-term contracts with parts suppliers to reduce the risk that they leak new ideas embodied in the design of new parts to other assemblers. If this is universally the case, as it probably is, the division of labor among manufacturing enterprises is also closely related with information spillovers.

As mentioned earlier, transaction costs arising from moral hazard, adverse selection, and hold-up problems tend to be low in the industrial cluster. The literature to be reviewed in the next section highlights transport costs rather than these transaction costs. A number of models in the literature assume that transport costs are saved by the proximity between trading partners in the industrial cluster, so that the division of labor among manufacturers develops in the cluster. Exceptions are recent models incorporating the idea that hold-up problems can be mitigated in the cluster where there are a large number of potential and alternative trading partners.⁶ However, the idea that the community mechanism of contract enforcement is at work in the cluster has not

whose managers used to work at the same enterprises employs essentially the same technology to produce the same products in the early stage of the development of the industry, and that such occupational backgrounds of managers have long-lasting effects on enterprise behaviors.

⁶ For example, Rotemberg and Saloner (2000) explore the implication of this idea for urban agglomeration, and McLaren (2000) and Grossman and Helpman (2002, 2005) explore it for outsourcing decisions and international trade.

yet been considered in the literature. We would also like to call attention to the fact that not only transactions among manufacturing enterprises but also those between manufacturing enterprises and merchants are active in the cluster due to the low transaction costs. This point has also been largely neglected in the literature on economic geography and industrial clusters.

It is one-sided to emphasize the importance of information spillovers as an advantage of the industrial cluster if the role of the cluster in promoting innovation is not equally appreciated. Marshall (1920, p. 271) argues that information spillovers become a source of innovation: “if one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas.” Based on our empirical findings, we would like to add to his argument the hypothesis that the industrial cluster provides business environments conducive to not only learning by doing and spillovers but also innovation, as it accumulates a variety of human resources useful for innovations. A basic tenet of the literature on economic geography since Jacobs (1969) is that innovations are enhanced by scale and diversity of metropolis.⁷ We hypothesize that even industrial clusters specializing in the production of particular products acquire diversity of human resources which facilitates innovations.

To sum up, we advance the hypotheses that the major advantages of clusters are: (1) the development of markets, which facilitates the transactions of parts, final goods, and skilled workers among parts-suppliers, assemblers, and merchants, and (2) the promotion of innovations by attracting useful human resources.

⁷ This idea is extended by Lucas (1988) in the economic growth setting and given a microeconomic foundation by Duranton and Puga (2001).

1.2 Economic Geography

One of the major issues in economic geography is to explain why and how the center and the periphery or urban and rural areas are created. The key to understanding such geographic differences is identified as “agglomeration economies” arising from the benefits of the concentration of economic activities in small areas, such as industrial clusters and large cities. The main issue of development economics is how to increase income and to improve its distribution, which includes the regional dimension. Yet, development economics has not paid much attention to the concept of agglomeration economies.⁸ Considering the importance of industrial clusters in industrial development, it makes a lot of sense to integrate the economics of geography with development economics. For this purpose, we briefly review the literature on economic geography and link it to the literature on industrialization, particularly in developing countries.

Major Issues

The economics of geography has traditionally classified agglomeration economies into “localization economies” and “urbanization economies.” The three advantages of industrial clusters identified by Marshall (1920) are localization economies since they arise from the geographical concentration and proximity of enterprises producing similar or closely related products. In the context of developing economies, Schmitz (1995b) defines “collective efficiency” as the competitive advantage derived from localization economies and collective actions which may be facilitated by the environments of the industrial cluster.⁹ The fact that transaction costs are low within a

⁸ Among exceptions are Murata (2002) and Yamamoto (2005).

⁹ Lall and Rodrigo (2001) provide some supporting evidence from India for the relevance of the concept of collective efficiency.

cluster is often expressed as low transport cost in theoretical models of economic geography (e.g., Krugman 1991). Urban areas are considered to be the “large-scale agglomeration of diverse industries.” Jacobs (1969, 1984) argues that innovative ideas are created through face-to-face interactions of experts of various types in large cities.¹⁰ Favorable access to many kinds of goods, services, and skills is another advantage of large cities. Such advantages are called urbanization economies. According to the production function analyses of Sveikauskas (1975) and Moomaw (1981), among others, productivity is higher in large urban areas than in small provincial towns. Furthermore, Glaeser et al. (1992) find from city-level data in the U.S. that the greater the scale of the city and the more diverse its industrial structure is, the higher the growth rate of productivity and employment.

Thus, while localization economies provide opportunities to imitate, reduce transaction costs, and develop skilled labor markets, urbanization economies enhance innovation possibilities. These benefits will increase with the size of the agglomeration. Social losses, however, also arise from the development of industrial clusters and cities because of increased commuting time and congestion. These negative externalities are called “agglomeration diseconomies.”

The thrust of the theory of economic geography is that the location of industry is determined by striking a balance between agglomeration economies and diseconomies (Henderson 1974, 1988). The headquarters of large enterprises and key TV stations, as well as advertising agents, banks, and insurance companies, are all located in large cities, whereas garment, shoe, eyeglass, and cutler industries tend to be located in local

¹⁰ Implications of this argument have been explored in the literature on endogenous economic growth (e.g., Romer 1986; Lucas 1988) and urban agglomeration (e.g., Jovanovic and Rob 1989; Jovanovic and Nyarko 1995; Glaeser 1999; Duranton and Puga 2001).

industrial clusters. Henderson (1974) argues that such patterns of industrial location reflect the differences among industries in the relative importance of urbanization and localization economies. Even within an industry, such differences exist; for example, the designing and marketing of fashionable garments tend to be carried out in large cities, whereas working clothes and men's shirts, whose demands are stable and not subject to the vagary of consumer tastes, tend to be produced in less urbanized areas. The former benefits more from urbanization economies than the latter. In other words, industries for which urbanization economies are important are located in large cities, and those which do not enjoy urbanization economies much tend to form industrial clusters in less urbanized areas in order to avoid urban congestion and enjoy localization economies.

The advantage of being located in the capital city is large, if the government interventions in the markets are pervasive, because management efficiency depends critically on the concessions and permissions the enterprises receive through favors given by bureaucrats and politicians. It is likely that capital cities in developing countries are often surprisingly large not necessarily because of the urbanization economies but presumably because of the adoption of the interventionist policies (Meyanathan, 1995; Henderson and Kuncoro 1996). In Korea, the geographical dispersion of large enterprises has taken place with the demise of policies favoring them, presumably because the advantage of being in Seoul has declined substantially (Nugent 1996; Henderson, Lee, and Lee 2001).

As Jacobs (1969, 1984) argues, diversified cities play an important role in enlarging innovation possibilities. Henderson, Kuncoro, and Turner (1995) hypothesize that this role of diversified cities is more important for new industries,

where new products and production methods are established through trial and error, than for mature industries. They demonstrate, using industry-wise data of cities in the U.S., that newly emerging industries tend to grow faster in large cities whereas mature industries tend to grow faster in small cities. These findings are interesting, as they suggest that the nature of agglomeration economies changes with the stages of industrial development.¹¹ As will be discussed in the descriptive analysis of industrial locations in Chapter 3, industries tend to be born in urban areas and they are later relocated to suburban and less urbanized areas in Japan, Taiwan, and China. Duranton and Puga (2001) provide a formal microeconomic model for the mechanism of the relocation of industries from diversified cities to specialized cities. From the perspective of economic development, however, it is regrettable that most of the empirical studies in economic geography have intended to present evidence for the existence of agglomeration economies rather than to examine the dynamic process leading to the dispersion of industries to areas where industries did not develop.¹²

There has been remarkable progress in mathematical theories of economic geography, which is termed “new spatial economics” or “new economic geography” (e.g., Krugman 1996; Fujita, Krugman, and Venables 1999; Fujita and Thisse 2002). By incorporating the benefits of networking economic agents into the model, the new economic geography sheds light on the process of creating external economies, rather than assuming their existence. In their survey of the empirical literature closely related to the new economic geography, Head and Mayer (2003) list five major ingredients of the models of the new economic geography: (1) increasing returns to scale at the

¹¹ Although not discussed by Henderson et al. (1995), a closer examination of their regression results reveals that even newly emerging industries tend to be relocated to less urbanized areas.

¹² See Rosenthal and Strange (2004) for a comprehensive survey of the recent empirical literature on agglomeration economies.

enterprise level, (2) imperfect competition, (3) trade costs which depend on the geographical proximity between trading partners, (4) endogenous firm locations, and (5) endogenous location of demand. According to Head and Mayer, the last one is the most unique characteristic to this theory because ingredients (1) to (4) are considered in the new trade literature as well. The endogenous location of demand arises from the mobility of workers, who are also consumers, and that of intermediate input suppliers. Workers and input suppliers gather where the demand for their labor and products is large, and they create the demand for products produced there with their labor and inputs. Thus, such mobility, together with the enterprise-level increasing returns and trade costs, creates circular causation giving rise to urban agglomeration and the core-periphery relationship among geographic areas, even though the areas are assumed to be homogenous *ex ante*.

In these models, there are often multiple equilibria with respect to which area becomes the core and which becomes the periphery. In other words, equilibrium is not determined solely by tastes, resource endowment, and technology, which have traditionally been considered to determine equilibrium uniquely, but it is influenced also by other factors, such as historical accident. It is also possible in these models that a physically inferior location can be chosen by enterprises because their decisions are influenced by the decisions of other agents, such as input suppliers and workers. If a number of them happen to choose an inferior location by accident, it continues to be an agglomeration. Krugman (1993) attributes the prosperity of present-day Chicago to such a phenomenon, as Chicago had developed as the hub of railroads and waterborne traffic which are no longer the major means of transportation.

Implications for Developing Countries

The costs of communication and transportation are generally high in developing countries, so that industrial clusters, if they develop, can have pervasive impacts on the pace of industrialization as they can reduce such costs among producers and between producers and merchants. If they develop in rural areas, the impacts on employment generation and poverty reduction could be enormous. Information and capital, however, are concentrated in cities and, hence, how to develop rural industries is a major challenge. In reality, rural industries do exist in developing countries in general (Mead 1984; Lanjouw and Lanjouw 2001), and in Asia in particular (Hayami 1998; Hayami and Kikuchi 2000; Ho 1979; Otsuka 1998, 2006; Ranis and Stewart 1993). The cases of the garment industries in Japan and China (Chapter 4) and the electric machinery and printed circuit board industries in China (Chapters 6 and 8, respectively) are examples of industrial development that took place in formerly rural areas. The economic geography has not touched upon such critical development issues.

In most models in the new economic geography literature, aggregate increasing returns in an industrial cluster as a whole arise from the forward- and backward-linkages through the transaction of differentiated intermediate inputs. As is described in Chapter 4 to 7, however, enterprises seldom need differentiated intermediate inputs in the early stage of industrial development, when their products are simple and standardized. Since marketing and procurement systems are underdeveloped at this stage, an important reason why industrial clusters are formed is that merchants buying products and selling materials gather there. At the later stages, enterprises use differentiated intermediate inputs in order to produce improved products, and accordingly, moral hazard and hold-up become potentially serious problems. A major advantage of industrial clusters then is that such problems are mitigated there

because of the reputation mechanism and relatively low monitoring costs. These transaction costs due to incomplete information and contracting, however, have seldom been considered in the new economic geography, in which the vast majority of models identify transaction costs with transport costs. Notable exceptions are the models developed by Rotemberg and Saloner (2000), McLaren (2000), Grossman and Helpman (2002, 2005), and Matouschek and Robert-Nicoud (2005), in which agglomeration reduces search costs and mitigates the hold-up problem. In their excellent survey of the theoretical literature on economic geography, Duranton and Puga (2004) urge economic geographers to pay more attention to the roles played by incomplete information. We fully agree with them that urban agglomeration is a result of enterprises' responses to market failures and that appropriate policies differ depending on which market failures are serious.

The pure theory of the new economic geography treats the question of where industrial clusters are formed as a matter of historical accident. To be sure, there are cases in which the reason why city A was chosen over nearby city B is totally unclear. Thus, it may not always make sense to investigate the reasons for the choice of certain locations by certain industries. Yet, what types of persons initiate which new industries or bring about new technology and marketing information to hitherto undeveloped areas, and what types of industries tend to be chosen in what areas need to be investigated, if we want to understand the whole process of industrial development from its birth to subsequent growth.

The empirical finding of Henderson et al. (1995) that newly emerging industries tend to be born in urban areas as the urbanization economies are particularly important, whereas mature industries are concentrated in less urbanized areas to enjoy the

localization economies, is interesting in itself and rich in policy implications. It is also consistent with the product cycle theory advanced by Vernon (1966), who argues that once production methods are standardized, the role of skilled workers diminishes and the optimal choice of production location becomes critically influenced by the cost of unskilled workers. Such dynamic changes suggest that the nature of agglomeration economies may change as the industry develops. For example, the development of skilled labor markets is likely to be important when the industry attempts to upgrade the quality of products and production methods. Indeed, the major advantage of Silicon Valley is identified to be the ample availability of superior human resources (Krugman 1991, Chapter 2; Saxenian 1994).

It will be extremely important to explore empirically if the finding of Henderson et al. (1995) is valid in developing countries. Specifically, a question arises as to whether new industries are born in large cities in developing countries as well. In the case of developed countries, the birth of a new industry is associated with the invention of new products and new production methods, which require a variety of new intermediate inputs and high skills. In many developing countries, industrialization begins with borrowed technologies, so that what types of inputs and workers are needed is fairly well-known from the inception of the industry. It is then possible that urbanization economies are not critically important in developing economies. If this is the case, it is intriguing to consider what geographical areas are conducive to the initiation of industrial development in developing countries.

1.3 Empirical Studies of Industrial Clusters

The recent surge of interest in industrial clusters was triggered by Piore and Sabel's

(1984) book entitled *The Second Industrial Divide*. According to them, as income increases, people demand a large variety of products and their demands change dynamically in an unexpected manner, so that conventional mass-production systems suitable for the large production of a small number of products are no longer viable. In order to produce a large number of products in small quantities in an efficient manner, it is necessary to establish flexible inter-enterprise networks while utilizing the merits of traditional craftsmanship. As an illustration, Piore and Sabel allude to the case of northern Italy, where SMEs cooperate to produce a variety of superior products.¹³ Also they cite the subcontracting system in Japan, which is also flexible and designed to produce a variety of new products.¹⁴

A Brief Literature Review

Stimulated by Piore and Sabel (1984), a large number of empirical studies on industrial clusters have been conducted in developing countries (e.g., Schmitz and Musyck 1994; Schmitz and Nadvi 1999; Humphrey and Schmitz 1996, 1998; Schmitz 2004). These studies suggest that the vertical division of labor among SMEs provides industrial clusters with a decisive advantage, and that clusters have the capacity to upgrade their products and production methods, which leads to large-scale exports.

More often than not, new enterprises do not have enough capital and face much uncertainty in the incipient stage of industrial development. Since many parts and components can be purchased from other enterprises in an industrial cluster, outsourcing saves new enterprises significant amount of initial capital investment. Furthermore,

¹³ While there are many papers reporting on cluster-based development in northern Italy, there are relatively a few analytical studies. See Brusco (1982) and Rabellotti (2004).

¹⁴ There is a substantial amount of literature on the subcontracting systems in Japan. See, for example, Asanuma (1985, 1989), Kawasaki and Macmillan (1987), Patrick and Rohlen (1987), Shinohara (1968), Watanabe (1970), and Whittaker (1997).

enterprises with low skills and technologies can enter the industry by imitating the production methods and products of the incumbents. Based on such inferences, Schmitz and Nadvi (1999) and Weijland (1999) propose the hypothesis that the advantage of industrial clusters is particularly large in the early stage of industrial development. Although they themselves did not test this hypothesis, our data to be examined in Chapters 4 to 7 are supportive of the hypothesis that the industrial cluster facilitates the entry of imitators. Yet, we will show that the role of the industrial cluster did not diminish but rather increased in the later stages of industrial development in our study sites.

In a garment cluster producing low-quality products in Lima, the performance of small enterprises is found to be good, even though the division of labor among enterprises is not so common (Visser 1999). Although the reason for this finding is not clear, judging from the statement that new profitable designs are quickly diffused in the cluster, information spillovers are likely to be the main advantage of the Lima cluster. Similarly, Kennedy (1999) suggests that information spillovers are a major advantage in the tannery cluster in India. Without any exception, our case studies find that industrial clusters are formed by the spin-offs of workers who used to work for the entrepreneurs who initiated the industries. These imitators produce essentially the same products as the founders using the same standardized materials and parts. Thus, much information spillover takes place in the early stage of cluster formation. The same phenomenon is reported in a study of many industrial clusters in Latin America (Altenburg and Meyer-Stamer 1999).

It is obvious but important to emphasize that the quality of products is low in the early stage of industrial development. It is a great boon to new industries in low

income economies that low quality products can be sold in the domestic markets where the demand for such products remains high. It is also important to recognize that low quality products are generally similar or standardized, because most producers imitate the best practice through information spillovers. Intermediate inputs, such as parts and components, are accordingly standardized. Thus, arm's length market transactions are common not only in the garment cluster in Lima (Visser 1999) but also in the shoe cluster in Mexico, which specializes in the production of low-quality products shipped to the domestic markets (Rabellotti 1999). In Taiwan, Amsden (1977) observes that standardized parts and components for standardized final products were transacted in an anonymous market in the machine tool industry in its early stage of development in the 1970s.

As is argued by Akerlof (1970) in his seminal work, information asymmetry between sellers and buyers hinders the transaction of goods and services with invisible quality. This argument may appear to imply that transaction costs due to asymmetric information is high in developing countries, where the system of quality assurance is not established. This is not necessarily the case, however, when the products and intermediate inputs transacted through markets are simple and not differentiated, because the quality of such goods can be easily checked by visual inspections. This is why the arm's length market transactions work well in the early stage of industrial development in developing countries. In such a circumstance, the purchase of intermediate inputs in the market is advantageous relative to in-house production, so that enterprises tend to specialize in certain tasks and their sizes tend to be small (Coase 1937).

As products are improved and differentiated, the mode of transaction in industrial

cluster undergoes drastic changes. In the cluster of surgical instruments in Pakistan, producers were forced to improve the quality of their products, as the U.S. banned the import of low-quality surgical instruments for sanitary reasons (Nadvi 1999). The critical strategies for the producers of final products were to find competent part-suppliers capable of delivering high-quality parts and to establish stable, long-term subcontracts with them. Based on the comparative study of the shoe industry between Italy and Mexico, Rabellotti (1995) finds that a major source of the international competitiveness of the industry in Italy was its long-term subcontracting system, which delivers high-quality materials and parts to the shoe manufacturers. Rabellotti (1999) later observes that responding to the increasing pressure of liberalized international markets in the 1980s, Mexican shoe producers began to look for stable subcontracts in order to improve the quality of products. Similarly, Schmitz (1995a, 1999) discovers that as the quality of shoes improves, the transaction of parts based on the long-term subcontracts became common in a shoe cluster in Brazil.¹⁵ Tewari (1999) provides consistent evidence from India, where the garment cluster used to export low-quality products to the Soviet Union. The collapse of the Soviet Union made the garment producers in India shift the destination of their exports to North America and Europe where higher quality products were demanded. Here too, the establishment of long-term contracts with part-suppliers was sought by the garment producers.

Taiwan is well-known for the cluster-based development of industries, which heavily rely on subcontracting systems among part-suppliers and final producers (see Chapter 3). Amsden (1985) who revisited the machine tool industry a decade later was surprised to find the remarkably rapid progress in the division and specialization of

¹⁵ Schmitz (1995a) points out that as the quality of products improves, the labor contracts also became longer. Amsden (1985) also finds similar changes in the machine tool industry in Taiwan.

labor between enterprises as the industry upgraded the products. Levy (1991) confirms the same tendency in the footwear industry, while Levy and Kuo (1991) find that the subcontracting system plays a significant role in the personal computer industry in this country.

Thus, there seems to be consensus in the literature that the main advantages of industrial clusters lie in the easy access to standardized parts at the markets and information spillovers in the early stage of cluster development when the products are simple, low-quality, and standardized, whereas the advantage shifts to the developed system of long-term subcontracting with part-suppliers at the later stage of the development when products become high-quality, differentiated, and often branded. The production of differentiated products requires specific parts made by specialized part-suppliers and, because of the development of exclusive subcontracting systems, information spillovers among producers lose importance, according to the observations of Rabellotti (1999) and Schmitz (1999).

Although not observed in our own case studies, producers in industrial clusters agree on joint actions to acquire useful technological and marketing information. For example, producer associations organize various activities including trade fairs in Italy (Brusco 1982), in the shoe cluster in Brazil (Schmitz 1995a), and the surgical instrument cluster in Pakistan (Nadvi 1999). Such joint actions are rational, if the cluster is export-oriented, as there is not much conflict of interest among the producers interested in exporting to large international markets.¹⁶ Needless to say, export to advanced countries becomes common only after the quality of products is sufficiently

¹⁶ Otsuka, Ranis, and Saxonhouse (1988) report the active effort of the All Japan Spinners Association to disseminate new technologies to its members, which were interested in the export of cotton yarn, in the late 19th and the early 20th century in Japan.

improved. As was discussed earlier, the industrial cluster seems conducive to quality upgrading and exporting, even though the precise mechanism by which quality upgrading takes place has not been analyzed.

The improvement of product quality entails the use of intermediate inputs with high quality. While the establishment of long-term relationships with dependable and competent suppliers is a way to secure such inputs, another way is to establish a vertically integrated production system in which high-quality parts and components are produced in house. The theoretical analysis of the division of labor by Becker and Murphy (1992) suggests that the advantage of in-house production over outsourcing increases when specific and complicated parts are required. According to Cawthorne (1995) and Rabelotti (1999), it is primarily large enterprises that export high-quality branded knitwear and shoes. Nadvi (1999) finds that large enterprises are successful in quality improvement by increasing the internal production of key parts.¹⁷ Our case studies, however, show that those enterprises which successfully improved product quality and established new marketing channels have grown to be large. Thus, the causation can be two-ways, running from large enterprise size to quality improvement as well as from the latter to the former.

Main Remaining Issues

The literature on industrial clusters provides useful insights into the changing importance of arm's-length market transactions and long-term subcontracting systems, quality upgrading, and information spillovers. Many of the findings of the existing studies are consistent with our findings in East Asia to be reported in Chapters 4 to 7.

Therefore, there is a good reason to believe that these findings are fairly general.

¹⁷ Schmitz (1995a) finds that the competitiveness of small enterprises increases when the quality of shoes improves in Brazil.

The existing studies, however, do not generally carry out rigorous statistical analyses and often rely on subjective judgments based on observations of a relatively small number of enterprises.¹⁸ For example, such key variables as quality improvement are seldom measured, and the relative performance of large and small enterprises is rarely assessed in terms of the comparison of total factor productivity, profits, or the growth rate of outputs. The second problem of the existing studies is its static nature. Although Schmitz and Nadvi (1999) properly emphasize the importance of analyzing “dynamic process of change,” most studies are concerned with relatively short-term changes, rather than the long-term process of industrial development from birth to subsequent growth and further to the maturity stage. As we have seen, quality improvement is treated as a response to trade liberalization, the collapse of the Soviet Union, and the ban of exports. A major question, from the viewpoint of long-term industrial development, is whether internal forces that stimulate quality improvement are built into the development process itself. Unless and until such an endogenous process is explored, the research on industrial upgrading remains incomplete.

Thirdly, we would like to point out that the linkage between this literature on industrial cluster and economic geography is not clear. Industrial clusters are sometimes located in large cities and other times in rural areas. Are urban clusters new and thriving or in the process of moving to less urbanized areas? What are the distinct characteristics of those clusters located in suburban or rural areas? In rural clusters, who provides designs, materials, parts, and, more importantly, marketing information to rural entrepreneurs? Although these issues are not much discussed in the existing literature, our case studies strongly suggest that it is merchants who link large urban

¹⁸ Some studies apply regression techniques but it seems to us that they tend to suffer from the simultaneous equation bias and shortcomings in the specification of the estimated functions.

markets with rural production sites. If export-oriented production spreads to less urbanized areas as argued by Krugman and Elizondo (1996), it seems to us that merchants or trading houses play a significant role. In fact, we contend that merchants play a key role in nurturing and bringing up industrial clusters in East Asia. Whether this is unique to this region remains to be seen.

1.4 Globalization and Industrial Clusters

Although accurate statistical evidence is difficult to obtain, industrial clusters seem to be becoming increasingly important throughout the world, including developing countries. Indeed, we observed the rapid rise of many industrial clusters in Zhejiang and Jiangsu provinces in China, which are the heartland of the rapid industrialization in this country. Industrial clusters are ubiquitous in South Asia, not to mention the software cluster in Bangalore and the huge garment cluster in Dhaka.¹⁹ Although seldom reported, there appears to be a non-negligible number of indigenous industrial clusters in Sub-Saharan Africa.²⁰

For industrial clusters in developing countries, what implications does globalization have? There is no consensus on the definition of globalization. A concept close to our understanding is that of Kaplinsky (2005, p. 9): “Globalization is characterized by the systematic reduction in the barriers to the cross-border flow of factors (labor and capital), products, technology, information, belief systems, ideas, and values.” Owing to the development of information and communication technologies, assisted by the drive towards the liberalized international movement of goods and

¹⁹ We are currently undertaking data collection from the garment producers in Dhaka.

²⁰ We have completed case studies of the garment clusters in Nairobi and the analyses are underway on the shoe cluster in Addis Ababa and the car repair cum metal processing cluster in Kumasi. See McCormick (1999) for a description of selected industrial clusters in Sub-Saharan Africa.

services, country barriers have been considerably lowered. In terms of the theoretical models of economic geography developed by Krugman (1991), this can be interpreted as a reduction in transport costs across regions. As he neatly demonstrates, a reduction in transport costs leads to the geographical concentration of production in a fewer locations, because of the scale economies or collective efficiency of industrial clusters. In other words, given lowered transport cost, the sum of production and transport costs is minimized by production by a small number of large, efficient industrial clusters, rather than a large number of small, inefficient clusters. It is, therefore, no wonder that the era of globalization is also the era of industrial clusters.

Gereffi (1999) first drew attention to the growing importance of “global value chains,” which link industrial clusters in developing countries to large markets in developed countries. A global value chain can be producer-driven or buyer-driven, in which either large multinational manufacturing enterprises or large supermarkets in advanced countries coordinate the production in low-wage economies and ship products to markets in advanced economies. The coordination and governance of transactions are critically important, since the products are differentiated and the production processes are complex. Buyer-driven global value chains are gaining importance in developing countries, because local producers do not possess the know-how to export their products to advanced countries. Focusing on East Asia, Gereffi initially expresses the optimistic view that the lead firm in a buyer-driven value chain almost automatically promotes process, product, and functional upgrading among small local producers, where functional upgrading refers to capacity building with respect to design, marketing, and branding, among other things.

According to the recent literature, there are several types of global value chains,

encompassing arm's-length market chains to captive value chains (Gereffi, Humphrey, and Sturgeon 2005) or quasi-hierarchical chains (Humphrey and Schmitz 2004b), and to purely hierarchical chains. Captive or quasi-hierarchical chains are characterized by the significant dependence of small suppliers on large buyers for advanced production methods, the designs of products, and marketing. This type of global value chains is most common in developing countries. Recent empirical studies almost unanimously find that local producers are offered favorable opportunity to learn advanced production and management methods if the lead firms are the leading producers (e.g., Kishimoto 2004; Okada 2004), and that in the case of buyer-driven global value chains, producers achieve product and process upgrading but not functional upgrading (Tewari 1999; Schmitz and Knorringer 2000; Humphrey and Schmitz 2004b; Kaplinsky 2005; Giuliani, Pietrobelli, and Rabellotti 2005). The latter can be explained simply by the fact that buyers' core competence lies in product development, design, branding, and marketing. In this connection, the contribution of Bazan and Navas-Aleman (2004) is noteworthy. They compare the quasi-hierarchical chain linking footwear producers in Brazil to the European and North American markets with the arm's length market chain which does not as firmly link local producers to these large markets but allows them to sell their products in the domestic and regional markets in Latin America. The major finding is that local producers in the latter have acquired substantial capabilities in design and marketing over time, unlike those in the former, who are unable to achieve functional upgrading.

What is the prospect of global value chains in fostering the development of industrial clusters, after all? Since our case studies do not cover global value chains, we cannot offer definitive answers to such a question. Nonetheless, a few remarks can

be made. First of all, we suspect that the actual importance of buyer-driven global value chains may be over-stated. As is pointed out by Kaplinsky (2005, p. 7), global value chains are growing in selected industries, such as textiles, clothing, furniture, autos and components. We did not encounter the dominance of global value chains in our case studies in East Asia, presumably because they penetrate into selected segments of the economy. Secondly, in order to attract global buyers, the technology levels of local producers must be reasonably high, so that with the additional instructions they are capable of exporting their products to markets in advanced economies, where high-quality products are demanded, as was the case in the Taiwanese PC industry (Kishimoto 2004). If not, the relationship is highly captive so that local producers would have limited opportunities to learn. Thus, the fundamental question is how to upgrade products, production, and the functions of local producers in the absence of the assistance of global buyers. In our view, the global value chain may become useful for further industrial development only after the industry has sufficiently developed.

We fully agree with Gereffi, Humphrey, and Sturgeon (2005, p. 91) that “The key to East Asia’s success was to move from captive value chains to a domestically more integrated and higher value-added form of exporting” We do not believe, however, that superior production and management capacities were acquired by Asian entrepreneurs primarily from global buyers. In this respect, we completely concur with Humphrey and Schmitz (2004b, p. 370) that “the firms which were most successful in functional upgrading and exporting new markets were companies which had acquired their design and marketing experience in the national markets.” This book analyzes the process in which small local producers acquire production and product technologies and develop marketing capacities so as to grow large and eventually become able to

export some of their products to advanced countries. In this process, local producers learn a great deal of advanced technological ideas and management know-how from foreign joint ventures and leading enterprises in the world.

1.5 Theory of Product Life Cycle

While the theory of product cycle (Vernon 1966) provides a useful macro-view of industrial development, the theory of product life cycle (e.g., Klepper 1996) traces the evolutionary development process from the viewpoint of firm behaviors.²¹ The former traces the evolution of an industry from the phase of developing new products by scientists, engineers, and skilled workers, followed by the phase of standardizing products and introducing mass production, and followed finally by the mature phase where the industry is relocated to low-wage countries.²² The latter focuses on the mechanism of the entry of new enterprises, the process of intensified R&D competition, and the shakeout of less innovative enterprises. Thus, these theories have different scopes, but both presuppose that a new industry begins with product development, followed by the standardization of products and production processes.

In the development process of an industry from its inception to the standardization phase, the number of enterprises increases but then declines sharply or gradually. As enterprises exit the industry and are merged with surviving ones, the

²¹ A strand of the endogenous growth literature incorporates Vernon's product cycle theory in economic growth with North-South trade. See, e.g., Grossman and Helpman (1991) and Segerstrom, Anant, and Dinopoulos (1990).

²² While the theory of product cycle views the development of a new industry from the standpoint of advanced economies, the theory of flying geese patterns of development looks into the development process of a series of new industries in developing economies beginning with the textile industry and moving to textile machinery and other industries (Akamatsu 1961). According to Lin et al. (1996), the Chinese economy has successfully followed the flying geese patterns for the last few decades. For a more formal treatment of the relocation of production base, see Duranton and Puga (2001).

market structure changes into an oligopoly. Such a development pattern is observed in a number of industries in developed countries (e.g., Gort and Klepper 1982; Klepper and Graddy 1990). In Chapter 5, we will observe similar patterns in the motorcycle industries in Japan and China. Beginning with Nelson and Winter (1978, 1982), a body of literature has developed that attempts to elucidate the mechanism of such a Schumpeterian evolution of market structure. The increases in the number of enterprises in nascent industries may be explained by the diffusion of knowledge or technology spillovers (e.g., Arrow 1962; Jovanovic and Lach 1989). The shakeout in which the number of enterprises declines may be described as a process of the selection of the fittest among heterogeneous enterprises (e.g., Jovanovic 1982; Hopenhayn 1992; Ericson and Pakes 1995; Pakes and Ericson 1998).²³ In order to understand the trend reversal from the increase to decrease in the number of enterprises, however, it seems necessary to consider the interaction between technological changes and market structure (e.g., Flaherty 1980; Shaked and Sutton 1987; Sutton 1998; Agarwal 1998; Agarwal and Audretsch 2001).

The product life cycle theory offers three distinct explanations to the trend reversal (Klepper and Simons 2005). In the model developed by Jovanovic and McDonald (1994), a major invention creates the possibility of a new innovation which increases the minimum efficiency scale of production in an industry.²⁴ To benefit from this opportunity, new enterprises enter the industry, but both the incumbents and the new entrants succeed in the innovation only by chance. Once successful in the

²³ The mechanism of shakeouts has also been extensively studied in the empirical literature on enterprise growth and survival (see e.g., Dunne, Roberts, and Samuelson 1988, 1989; Evans 1987 a, b).

²⁴ As Schumpeter (1912) argues, innovation is not a scientific discovery or engineering invention but the process of the commercial application of new ideas.

innovation, enterprises expand their production scale with the new technology, and as a result, the price of output declines. Since imitation is assumed to be difficult, the decline in the price puts pressure on those enterprises which have been unsuccessful in innovation, until all such unsuccessful enterprises are forced to exit the industry.

An alternative theory is offered by Utterback and Suárez (1993) and Ufuah and Utterback (1997) based on the literature on management history, such as Abernathy, Clark, and Kantrow (1983) and Abernathy and Utterback (1978). Enterprises enter a new industry one after another upon the development of different designs for the product of the industry. Possibilities of developing new designs, however, are exhausted sooner or later, and a dominant design or a de facto standard emerges. Then, enterprises rapidly increase investments in R&D and equipment in order to produce the dominant design at lower costs than other enterprises. A shakeout occurs because inefficient enterprises that cannot keep up with the intensified cost-reduction competition are forced to exit.

Klepper (1996, 2002) emphasizes that the technology and market structure of an industry evolve together. In his model, earlier entrants tend to have larger output than later entrants at each moment and, hence, the former tend to benefit more from cost reduction and quality improvement. Thus, they tend to invest more in new technologies. New entrants need to have increasingly higher R&D capabilities to compete with the early entrants. Thus, new entries decrease over time and then cease, but the price of output continues to fall because the R&D competition continues. The declining price forces less innovative enterprises to exit the industry. Klepper and Simons (2005) use detailed data on four industries to find that the Klepper model provides the best explanation to the observed patterns of evolutionary changes in

technology and market structure.

A major question is whether these product life cycle theories are relevant to the industrial development process in developing countries. This literature has been developed to explain the process of industrial development in developed countries. Including Klepper and Simons (2005), all the empirical studies in this literature use data collected from the most advanced economies. A critically important point is that industrial development in developing countries does not begin with product innovations but the imitation of the dominant designs established in developed countries long ago. Thus, what matters for the emergence of a new industry is not the ability to create new products but the ability to assimilate foreign technology (Stewart 1978; White 1978; Pack and Whestphal 1986). Usually, in developing countries, enterprises copy imported products using inferior materials and parts and employing less-mechanized systems of production. The successful imitation of foreign technology is followed by further imitation, which is much easier than the initial one. After the number of enterprises increases in this way, it ceases increasing or begins decreasing due to the declining price of output as in developed countries. A major question arises as to whether the mechanism of shakeout is the same as the ones described by the existing theories of product life cycle.

Both theoretical and empirical studies of product life cycle have paid little attention to the issue of where industries develop. Notable exceptions are Greenstein and Wade (1998), Klepper and Simons (2000), and Klepper (2002). They find that larger and older firms located in industrial clusters tend to have a higher probability of survival as they quickly introduce new technologies invented in the process of the product life cycle. These observations are consistent with the existence of the

“collective efficiency” of industrial clusters (Schmitz 1995b).

According to Schumpeter (1912), innovation is the process by which entrepreneurs create a new combination of production resources to increase their profits, and it includes the improvement of products, production methods, production organization, and marketing, as well as the discovery of a new source of materials. While the existing theories of product life cycle highlight narrowly-defined technological changes, these various improvements play important roles in industrial development in developing countries as our literature survey in the previous sections attests to. Moreover, unlike in developed countries, intellectual property rights are not generally protected in developing countries. The critical question is by whom, how, and under what conditions successful innovations take place in developing countries. Thus, we need a theory of product life cycle that is appropriate for the proper understanding of the industrial development in developing countries. This is precisely the issue we attempt to address in this book.

1.6 Summary

We have found that although industrial development has ceased to be discussed as a major issue in development economics, a voluminous and useful literature exists in the neighboring fields, such as the new economic geography, the empirical studies of industrial clusters in developing countries, and the theory of product life cycle. Regretfully, however, these studies have been conducted independently without much interaction. Moreover, empirical studies are commonly weak. Furthermore, the direct applicability of the theory of product life cycle to the industrial development in developing countries is questionable, even though the insight into the long-term

evolutionary process obtained in this literature is highly valuable.

The purpose of this study therefore is to synthesize the existing studies while undertaking rigorous empirical studies based on the enterprise-level, primary data collected by the authors and their collaborators. More specifically, (1) following the lead of economic geography, we pay special attention to the spatial dimension of industrial development and cluster formation, (2) based on the empirical studies of industrial clusters, we focus on the relative importance of market transactions and subcontracting in relation to the quality improvement of products, and (3) taking into account the decisive role of innovation in the evolutionary process of industrial development established by the theory of product life-cycle, we attempt to explore the mechanism leading to the innovation and subsequent imitation in the context of developing countries. Unlike the existing empirical literature, we carefully analyze the occupational background and other personal traits of enterprise managers and the performance of their enterprises at different stages of industrial development. We believe that an evolutionary process of industrial development based on successful innovations and subsequent imitations can be elucidated only through such analyses of the personal history and the characteristics of innovators and imitators and their changing performances in the long-term process of industrial development.

References

- Abernathy, W.J., Clark, K.B., and Kantraw, A.M. (1983), *Industrial Renaissance: Producing a Competitive Future for America* (New York: Basic Books).
- Abernathy, W.J., and Utterback, J.M. (1978), 'Patterns of Industrial Innovation', *Technology Review*, 80(6), 41-17.
- Agarwal, R. (1998), 'Evolutionary Trends of Industry Variables', *International Journal of Industrial Organization*, 16 (4), 511-25.
- Agarwal, R., and Audretsch, D. (2001), 'Does Entry Size Matter? The Impact of the Life Cycle and Technology on Firm Survival', *Journal of Industrial Economics*, 49(1), 21-43.
- Akamatsu, K. (1961), 'A Theory of Unbalanced Growth in the World Economy', *Weltwirtschaftliches Archiv*, 86(2), 196-217.
- Akerlof, G.A. (1970), 'The Market for 'Lemons': Quality Uncertainty and the Market Mechanism', *Quarterly Journal of Economics*, 84(3), 488-500.
- Altenburg, W., and Meyer-Stamer, J. (1999), 'How to Promote Clusters: Policy Experiences from Latin America', *World Development*, 27(9), 1693-713.
- Amsden, A.H. (1977), 'The Division of Labor is Limited by the Type of Market: The Case of the Taiwanese Machine Tool Industry', *World Development*, 5(3), 217-33.
- Amsden, A.H. (1985), 'The Division of Labor is Limited by the Rate of Growth of the Market: The Taiwan Machine Tool Industry in the 1970s', *Cambridge Journal of Economics*, 9(3), 271-84.
- Arrow, K.J. (1962), 'The Economic Implications of Learning by Doing', *Review of Economic Studies*, 29(3), 155-74.
- Asanuma, B. (1985), 'The Organization of Parts Purchases in the Japanese Automotive Industry', *Japanese Economic Studies*, 13(4), 32-53.
- Asanuma, B. (1989), 'Manufacturer-Supplier Relationships in Japan and the Concept of Relation-Specific Skill', *Journal of Japanese and International Economics*, 3(1), 1-30.
- Bardhan, P., and Udry, C. (1999), *Development Microeconomics* (Oxford: Oxford University Press).
- Bazan, L., and Navas-Aleman, L. (2004), 'The Underground Revolution in the Sinos Valley: A Comparison of Upgrading in Global and National Value Chains', in H. Schmitz (ed.), *Local Enterprises in the Global Economy* (Cheltenham, UK: Edward Elgar Publishing), 110-39.
- Becker, G.S., and Murphy, K.M. (1992), 'The Division of Labor, Coordinating Costs, and Knowledge', *Quarterly Journal of Economics*, 107(4), 1137-60.
- Brusco, S. (1982), 'The Emilian Model: Productive Decentralization and Social Integration', *Cambridge Journal of Economics*, 6(2), 167-84.
- Cawthorne, P.M. (1995), 'Of Networks and Markets: The Rise of a South Indian Town, The Example of Tiruppur's Cotton Knitwear Industry', *World Development*, 23(1), 43-56.
- Ciccone, A., and Matsuyama, K. (1996), 'Start-up Cost and Pecuniary Externalities as Barriers to Economic Development', *Journal of Development Economics*, 49(1), 33-59.
- Coase, R.H. (1937), 'The Nature of the Firm', *Economica*, 16(6), 386-405.
- David, C.C. and Otsuka, K. (1994), *Modern Rice Technology and Income Distribution in Asia* (Boulder: Lynne Rienner).
- Dunne, T., Roberts, M.J., and Samuelson, L. (1988), 'Patterns of Firm Entry and Exit in US Manufacturing Industries', *RAND Journal of Economics*, 19(4), 495-515.
- Dunne, T., Roberts, M.J., and Samuelson, L. (1989), 'The Growth and Failure of US Manufacturing Plants', *Quarterly Journal of Economics*, 104(4), 671-98.
- Duranton, G., and Puga, D. (2001), 'Nursery Cities: Urban Diversity, Process Innovation, and the Life Cycle of Product', *American Economic Review*, 91(5), 1454-77.
- Duranton, G., and Puga, D. (2004), 'Micro-Foundations of Urban Agglomeration Economies', in J.V. Henderson and J. Thisse (eds.), *Handbook of Regional and Urban Economics*, Volume 4 (Amsterdam: Elsevier).
- Ericson, R., and Pakes, A. (1995), 'Markov-Perfect Industry Dynamics: A Framework for Empirical Work', *Review of Economic Studies*, 62(1), 53-82.

- Estudillo, J.P. and Otsuka, K. (1999), 'Green Revolution, Human Capital, and Off-Farm Employment: Changing Sources of Income among Farm Households in Central Luzon, 1966-94', *Economic Development and Cultural Change*, 47(3), 497-523.
- Evans, D.S. (1987a), 'Tests of Alternative Theories of Firm Growth', *Journal of Political Economy*, 95(4), 657-74.
- Evans, D.S. (1987b), 'The Relationship between Firm Growth, Size, and Age: Estimates for 100 Manufacturing Industries', *Journal of Industrial Economics*, 35(4), 567-81.
- Fei, J.C.H. and Ranis, G. (1964), *Development of the Labor Surplus Economy: Theory and Evidence* (New Haven: Yale University Press).
- Flaherty, M.T. (1980), 'Industry Structure and Cost-Reducing Investment', *Econometrica*, 48 (5), 1187-1209.
- Fujita, M., Krugman, P., and Venables, A.J. (1999), *The Spatial Economy: Cities, Regions, and International Trade* (Cambridge, MA: MIT Press).
- Fujita, M., and Thisse, J.F. (2002), *Economics of Agglomeration: Cities, Industrial Location and Regional Growth* (Cambridge, UK: Cambridge University Press).
- Gereffi, G. (1999), 'International Trade and Industrial Upgrading in the Apparel Commodity Chain', *Journal of International Economics* 48(1), 37-70.
- Gereffi, G., Humphrey, J., and Sturgeon, T. (2005), 'The Governance of Global Value Chains', *Review of International Political Economy*, 12(1), 78-104.
- Giuliani, E., Pietrobelli, C., and Rabelotti, R., (2005), 'Upgrading in Global Value Chains: Lessons from Latin American Clusters', *World Development* 33(4), 549-73.
- Glaeser, E.L. (1999), 'Learning in Cities', *Journal of Urban Economics*, 46(2), 254-77.
- Glaeser, E.L., Kallal, H.D., Scheinkman, J.A., and Shleifer, A. (1992), 'Growth in Cities', *Journal of Political Economy*, 100(6), 1126-52.
- Gort, M., and Klepper, S. (1982), 'Time Paths in the Diffusion of Product Innovations', *Economic Journal*, 92(367), 630-53.
- Greenstein, S.M., and Wade, J.B. (1998), 'The Product Life Cycle in the Commercial Mainframe Computer Market, 1968-1982', *RAND Journal of Economics*, 29(4), 772-89.
- Grossman, G.M., and Helpman, E. (1991), *Innovation and Growth in the Global Economy* (Cambridge, MA: MIT Press).
- Grossman, G.M., and Helpman, E. (2002), 'Integration versus Outsourcing in Industry Equilibrium', *Quarterly Journal of Economics*, 117(1), 85-119.
- Grossman, G.M., and Helpman, E. (2005), 'Outsourcing in a Global Economy', *Review of Economic Studies*, 72(1), 135-59.
- Hayami, Y. (1998), 'Toward an Alternative Paradigm of Economic Development: An Introduction', in Y. Hayami (ed.), *Toward the Rural-Based Development of Commerce and Industry: Selected Experiences from East Asia* (Washington, DC: World Bank Economic Development Institute).
- Hayami, Y. (2001), *Development Economics: From the Poverty to the Wealth of Nations* (Oxford: Oxford University Press).
- Hayami, Y., and Godo, Y. (2005), *Development Economics: From the Poverty to the Wealth of Nations* (Oxford: Oxford University Press).
- Hayami, Y., and Kawagoe, T. (1993), *The Agrarian Origin of Commerce and Industry: A Study of Peasant Marketing in Indonesia* (London: Macmillan).
- Hayami, Y., and Kikuchi, M. (2000), *A Rice Village Saga: Three Decades of Green Revolution in the Philippines* (London: Macmillan).
- Hayami, Y., and Otsuka, K. (1993), *The Economics of Contract Choice: An Agrarian Perspective* (Oxford: Clarendon Press).
- Head, K., and Mayer, T. (2003), 'The Empirics of Agglomeration and Trade' in J.V. Henderson and J.F. Thisse (eds.), *Handbook of Regional and Urban Economics*, Volume 4 (Amsterdam: Elsevier).
- Henderson, J.V. (1974), 'The Sizes and Types of Cities,' *American Economic Review*, 64(3), 640-56.
- Henderson, J.V. (1988), *Urban Development: Theory, Fact, and Illusion* (New York: Oxford University Press).
- Henderson, J.V., and Kuncoro, A. (1996), 'Industrial Centralization in Indonesia', *World Bank Economic Review*, 10(3), 513-40.

- Henderson, J.V., Kuncoro, A., and Turner, M. (1995), 'Industrial Development in Cities', *Journal of Political Economy*, 103(5), 1067-90.
- Henderson, J.V., Lee, T., and Lee, J.Y. (2001), 'Scale Externalities in Korea', *Journal of Urban Economics*, 49(3), 479-504.
- Hirschman, A.O. (1958), *The Strategy of Economic Development* (New Haven: Yale University Press).
- Ho, S.P.S. (1979), 'Decentralized Industrialization and Rural Development', *Economic Development and Cultural Change*, 28(1), 77-96.
- Hopenhayn, H. (1992), 'Entry, Exit, and Firm Dynamics in Long-Run Equilibrium', *Econometrica*, 60(5), 1127-50.
- Humphrey, J., and Schmitz, H. (1996), 'The Triple C Approach to Local Industrial Policy', *World Development*, 24(12), 1859-77.
- Humphrey, J., and Schmitz, H. (1998), 'Trust and Inter-Firm Relations in Developing and Transition Economies', *Journal of Development Studies*, 34(4), 32-61.
- Humphrey, J., and Schmitz, H. (2004b), 'Chain Governance and Upgrading: Taking Stock', in H. Schmitz (ed.), *Local Enterprises in the Global Economy* (Cheltenham, UK: Edward Elgar Publishing), 349-81.
- Jacobs, J. (1969), *The Economy of Cities* (New York: Vintage).
- Jacobs, J. (1984), *The Wealth of Nations: Principles of Economic Life* (New York: Vintage).
- Jovanovic, B. (1982), 'Selection and the Evolution of Industry', *Econometrica*, 50(3), 649-70.
- Jovanovic, B., and Lach, S. (1989), 'Entry, Exit, and Diffusion with Learning by Doing', *American Economic Review*, 79(4), 690-699.
- Jovanovic, B., and MacDonald, G. (1994), 'The Life Cycle of a Competitive Industry', *Journal of Political Economy*, 102(2), 322-47.
- Jovanovic, B., and Nyarko, Y. (1995), 'The Transfer of Human Capital', *Journal of Economic Dynamics and Control*, 19 (5-7), 1033-64.
- Jovanovic, B., and Rob, R. (1989), 'The Growth and Diffusion of Knowledge', *Review of Economic Studies*, 56 (4), 569-82.
- Kaplinsky, R. (2005), *Globalization, Poverty and Inequality: Between a Rock and a Hard Place* (Cambridge, UK: Polity Press).
- Kawasaki, S., and Macmillan, J. (1987), 'The Design of Contracts: Evidence from Japanese Subcontracting', *Journal of the Japanese and International Economies*, 1(1), 327-49.
- Kennedy, L. (1999), 'Cooperating for Survival: Tannery Pollution and Joint Action in the Palar Valley (India)', *World Development*, 27(9), 1673-91.
- Kishimoto, C. (2004), 'Clustering and Upgrading in Global Value Chains: the Taiwanese Personal Computer Industry', in H. Schmidt (ed.), *Local Enterprises in the Global Economy* (Cheltenham: Edward Elgar Publishing)
- Klepper, S. (1996), 'Entry, Exit, Growth, and Innovation over the Product Life Cycle', *American Economic Review*, 86(3), 562-83.
- Klepper, S. (2002), 'Firm Survival and the Evolution of Oligopoly', *RAND Journal of Economics*, 33(1), 37-61.
- Klepper, S., and Graddy, E. (1990), 'The Evolution of New Industries and Determinants of Market Structure', *RAND Journal of Economics*, 21(1), 27-44.
- Klepper, S., and Simons, K.L. (2000), 'The Making of Oligopoly: Firm Survival and Technological Change in the Evolution of the U.S. Tire Industry', *Journal of Political Economy*, 108(4), 728-60.
- Klepper, S., and Simons, K.L. (2005), 'Industry Shakeouts and Technological Change', *International Journal of Industrial Organization*, 23(1), 23-43.
- Kotter, J.P. (1997), *Matsushita Leadership: Lessons from the 20th Century's Most Remarkable Entrepreneur* (New York: Free Paper).
- Krugman, P. (1991), *Geography and Trade* (Cambridge, MA: MIT Press).
- Krugman, P. (1993), 'First Nature, Second Nature, and Metropolitan Location', *Journal of Regional Science*, 33(2), 129-44.
- Krugman, P. (1996), *The Self-Organizing Economy* (Cambridge, MA: Blackwell).
- Krugman, P. and Elizondo, R.L. (1996), 'Trade Policy and the Third World Metropolis', *Journal of*

- Development Economics*, 49(1), 137-50.
- Lall, S.V., and Rodrigo, G.C. (2001), 'Perspectives on the Sources of Heterogeneity in Indian Industry', *World Development*, 29(12), 2127-43.
- Lanjouw, J.O., and Lanjouw, P. (2001) 'The Rural Non-farm Sector: Issues and Evidence from Developing Countries', *Agricultural Economics*, 26(1), 1-23.
- Levy, B. (1991), '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*, 34(1/2), 151-78.
- Levy, B. and Kuo, W.J. (1991), 'The Strategic Orientation of Firms and the Performance of Korea and Taiwan in Frontier Industries: Lessons from Comparative Studies of Keyboard and Personal Computer Assembly,' *World Development*, 19(4), 363-74.
- Lewis, W.A. (1954), 'Economic Development with Unlimited Supply of Labor', *Manchester School of Economic and Social Studies*, 22(1), 139-91.
- Lin, J.Y., Cai, F., and Li, Z. (1996), *The China Miracle: Development Strategy and Economic Reform* (Hong Kong: Chinese University Press).
- Lucas, R. E., Jr. (1988), 'On the Mechanics of Economic Development', *Journal of Monetary Economics*, 22(1), 3-42.
- Marshall, A. (1920). *Principles of Economics* (London: Macmillan).
- Matsuyama, K. (1991), 'Increasing Returns, Industrialization, and Indeterminacy of Equilibrium', *Quarterly Journal of Economics*, 106(2), 617-50.
- Matouschek, N., and Robert-Nicoud, F. (2005), 'The Role of Human Capital Investments in the Location Decision of Firms', *Regional Science and Urban Economics*, 35 (5), 570-83.
- McCormick, D. (1999), 'African Enterprise Clusters and Industrialization', *World Development*, 27(9), 1531-51.
- McLaren, J. (2000), 'Globalization and Vertical Structure', *American Economic Review*, 90 (5), 1239-54.
- Mead, D.C. (1984), 'Of Contracts and Subcontracts: Small Firms in Vertically Dis-integrated Production/Distribution Systems in LDCs', *World Development*, 12(11/12), 1095-106.
- Meyanathan, S.D., ed. (1995), *Industrial Structures and the Development of Small and Medium Enterprise Linkages: Examples from East Asia* (Washington, DC: World Bank Economic Development Institute).
- Milgrom, P., and Roberts, J. (1992), *Economics, Organization and Management* (Englewood Cliffs, NJ: Prentice Hall).
- Moomaw, R.L. (1981), 'Productivity and City Size: A Critique of the Evidence', *Quarterly Journal of Economics*, 96(4), 675-88.
- Morosini, P. (2004), 'Industrial Clusters, Knowledge Integration and Performance', *World Development*, 32(2), 305-26.
- Murata, Y. (2002), 'Rural-Urban Interdependence and Industrialization', *Journal of Development Economics*, 68(1), 1-34.
- Murphy, K.M., Shleifer, A., and Vishny, R.W. (1989), 'Industrialization and the Big Push', *Journal of Political Economy* 97(5), 1003-26.
- Nadvi, K. (1999), 'Collective Efficiency and Collective Failure: The Response of the Sialkot Surgical Instrument Cluster to Global Quality Pressures', *World Development*, 27(9), 1605-26.
- Nelson, R.R., and Winter, S.G. (1978), 'Forces Generating and Limiting Concentration under Schumpeterian Competition', *Bell Journal of Economics*, 9(2), 524-48.
- Nelson, R.R., and Winter, S.G. (1982), *An Evolutionary Theory of Economic Change* (Cambridge MA: Harvard University Press).
- Nugent, J.B. (1996), 'What Explains the Trend Reversal in the Size Distribution of Korean Manufacturing Establishments?', *Journal of Development Economics*, 48(2), 225-51.
- Okada, A. (2004), 'Skills Development and Interfirm Learning Linkages under Globalization: Lessons from the Indian Automobile Industry', *World Development*, 32(7), 1265-88.
- Otsuka, K. (1998), 'Rural Industrialization in East Asia', in Y. Hayami and M. Aoki (eds.), *The Institutional Foundation of East Asian Economic Development* (London: Macmillan Press).
- Otsuka, K. (2006), 'Rural Industrialization in East Asia: What Influences its Nature and Development?' in S. Haggblade, P. Hazell, and T. Reardon, (eds.), *Transforming the Rural*

- Nonfarm Economy* (Wallingford: CAB International).
- Otsuka, K., Ranis, G., and Saxonhouse, G. (1988), *Comparative Technology Choice in Development: The Indian and Japanese Cotton Textile Industries* (London: Macmillan Press).
- Pack, H., and Westphal, L.E. (1986), 'Industrial Strategy and Technological Change: Theory versus Reality', *Journal of Development Economics*, 22(1), 87-128.
- Pakes, A., and Ericson, R. (1998), 'Empirical Implication of Alternative Models of Firm Dynamics', *Journal of Economic Theory*, 79(1), 1-45.
- Patrick, H.H., and Rohlen, T.P. (1987) 'Small-Scale Family Enterprises', in K. Yamamura and Y. Yasuba (eds.), *The Political Economy in Japan*, Vol. 1, *The Domestic Transformation*, (Stanford: Stanford University Press).
- Piore, M.J., and Sabel, C.F. (1984), *The Second Industrial Divide: Possibilities for Prosperity* (New York: Basic Books).
- Porter, M.E. (1990), *The Competitive Advantage of Nations* (London: Macmillan).
- Rabellotti, R. (1995), 'Is There an 'Industrial District Model'? Footwear Districts in Italy and Mexico Compared', *World Development*, 23(1), 29-41.
- Rabellotti, R. (1999), 'Recovery of Mexican Cluster: Devaluation Bonanza or Collective Efficiency', *World Development*, 27(9), 1571-85.
- Rabellotti, R. (2004), 'How Globalization Affects Italian Industrial Districts: the Case of Brenta', in H. Schmitz (ed.), *Local Enterprises in the Global Economy* (Cheltenham, UK: Edward Elgar), 140-73.
- Ranis, G., and Stewart, F. (1993), 'Rural Nonagricultural Activities in Development: Theory and Application', *Journal of Development Economics*, 40(1), 75-101.
- Romer, P.M. (1986), 'Increasing Returns and Long-Run Growth', *Journal of Political Economy*, 94(5), 1002-37.
- Rosenstein-Rodan, P.N. (1943), 'Problems of Industrialization in Eastern and Southern Europe', *Economic Journal* 53, 202-11.
- Rosenthal, S.S., and Strange, W.C. (2004), 'Evidence on the Nature and Sources of Agglomeration Economies', in J.V. Henderson and J.F. Thisse (eds.), *Handbook of Regional and Urban Economics*, Volume 4 (Amsterdam: Elsevier).
- Rotemberg, J.J., and Saloner, G. (2000), 'Competition and Human Capital Accumulation: A Theory of Interregional Specialization and Trade', *Regional Science and Urban Economics*, 30(4), 373-404.
- Saxenian, A. (1994), *Regional Advantage: Culture and Competition in Silicon Valley and Route 128* (Cambridge, MA: Harvard University Press).
- Schmitz, H. (1995a), 'Small Shoemakers and Fordist Giants: Tale of a Supercluster', *World Development*, 23(1), 9-28.
- Schmitz, H. (1995b), 'Collective Efficiency: Growth Path for Small-Scale Industry', *Journal of Development Studies*, 31(4), 529-66.
- Schmitz, H. (1999), 'Global Competition and Local Cooperation: Success and Failure in the Sinos Valley, Brazil', *World Development*, 27(9), 1627-50.
- Schmitz, H. (ed.), 2004. *Local Enterprises in the Global Economy: Issues of Governance and Upgrading* (Cheltenham, UK: Edward Elgar).
- Schmitz, H., and Knorringa, P. (2000), 'Learning from Global Buyers', *Journal of Development Studies*, 37(2), 177-205.
- Schmitz, H., and Musyck, B. (1994), 'Industrial Districts in Europe: Policy Lessons for Developing Countries', *World Development*, 22(6), 889-910.
- Schmitz, H., and Nadvi, K. (1999), 'Clustering and Industrialization', *World Development*, 27(9), 1503-14.
- Schumpeter, J.A. (1912), *The Theory of Economic Development* (New York: Oxford University Press).
- Segerstrom, P. S., Anant, T.C.A., and Dinopoulos, E. (1990), 'A Schumpeterian Model of the Product Life Cycle', *American Economic Review*, 80(5), 1077-91.
- Shaked, A., and Sutton, J. (1987), 'Product Differentiation and Industrial Structure,' *Journal of Industrial Economics*, 36(2), 131-46.
- Shinohara, M. (1968), 'A Survey of the Japanese Literature on Small Industry', in B.F. Hoselitz (ed.), *The Role of Small Industry in the Process of Economics Growth* (Hague: Mouton).
- Sonobe, T., Hu, D., and Otsuka, K. (2002), 'Process of Cluster Formation in China: A Case Study of

- a Garment Town', *Journal of Development Studies*, 39(1), 118-39.
- Sonobe, T., Hu, D., and Otsuka, K. (2004), 'From Inferior to Superior Products: An Inquiry into the Wenzhou Model of Industrial Development in China', *Journal of Comparative Economics*, 32(3), 542-63.
- Sonobe, T., Hu, D., and Otsuka, K. (2006), 'Industrial Development in the Inland Region of China: A Case Study of the Motorcycle Industry', *Journal of Comparative Economics*.
- Sonobe, T., Kawakami, M., and Otsuka K. (2003), 'Changing Role of Innovation and Imitation in Development: The Case of the Machine Tool Industry in Taiwan', *Economic Development and Cultural Change*, 52(1), 103-28.
- Stewart, F. (1978), *Technology and Underdevelopment*, second edition (London: Macmillan).
- Sutcliffe, R.B. (1971), *Industry and Underdevelopment* (London: Addison-Wesley).
- Sutton, J. (1998), *Technology and Market Structure* (Cambridge, Mass: MIT Press).
- Sveikauskas, L. (1975), 'The Productivity of Cities', *Quarterly Journal of Economics*, 89(3), 393-413.
- Swann, P., Prevezer, M., and Stout, D. (eds.) (1998), *The Dynamics of Industrial Clustering: International Comparisons in Computing and Biotechnology*. (Oxford: Oxford University Press).
- Tewari, M. (1999), 'Successful Adjustment in Indian Industry: The Case of Ludiana's Woolen Knitwear Cluster', *World Development*, 27(9), 1651-71.
- Utterback, J.M. and Suárez, F.F. (1993), 'Innovation, Competition, and Industry Structure', *Research Policy* 22(1), 1-21.
- Ufuah, A.N., and Utterback, J.M. (1997) 'Responding to Structural Industry Changes: A Technological Evolution Perspective', *Industrial and Corporate Change*, 6(1), 183-202.
- Vernon, R. (1966), 'International Investment and International Trade in the Product Cycle', *Quarterly Journal of Economics*, 80(2), 197-207.
- Visser, E.-J. (1999), 'A Comparison of Clustered and Dispersed Firms in the Small-Scale Clothing Industry of Lima', *World Development*, 27(9), 1553-70.
- Watanabe, S. (1970), 'Entrepreneurship in Small Enterprises in Japanese Manufacturing', *International Labor Review*, 102(6), 531-76.
- Weijland, H. (1999), 'Microenterprise Clusters in Rural Indonesia: Industrial Seedbed and Policy Target', *World Development*, 27(9), 1515-30.
- White, L.J. (1978), 'The Evidence on Appropriate Factor Proportions for Manufacturing in Less Developed Countries: A Survey', *Economic Development and Cultural Change*, 27(1), 27-59.
- Williamson, O. (1985), *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting* (New York: Free Press).
- Whittaker, D.H. (1997), *Small Firms in the Japanese Economy* (Cambridge, UK: Cambridge University Press).
- Yamamoto, K. (2005), 'A Two-Region Model with Two Types of Manufacturing Technologies and Agglomeration', *Regional Science and Urban Economics*, 35(6), 808-36.
- Yamamura, E., Sonobe, T. and Otsuka, K. (2003), 'Human Capital, Cluster Formation, and International Relocation: The Case Study of the Garment Industry in Japan, 1968-98', *Journal of Economic Geography*, 3(1), 37-56
- Yamamura, E., Sonobe, T., and Otsuka, K. (2005), 'Time Path in Innovation, Imitation, and Growth: The Case of the Motorcycle Industry in Postwar Japan', *Journal of Evolutionary Economics*, 15(2), 169-86.