

Industrial Clusters in Developing Countries: A Survey of the Literature

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Abstract

This paper provides a survey of the theoretical and empirical literature relating to industrial clusters. These clusters are groups of firms that are specialized by sector, located in close geographic proximity and consist of mostly small and medium sized enterprises. The benefits to firms from clustering are sometimes referred to as active and passive collective efficiency. Passive collective efficiency refers to benefits accruing to a firm by virtue of being in a cluster, such as access to markets and skilled labor, technological spillovers, flexible specialization, and reduced transaction costs. Active collective efficiency, on the other hand, stems from purposeful cooperation between clustered firms to undertake a large-scale project to upgrade production, such as entering into product marketing.

I. Introduction

An industrial cluster is a group of firms that are specialized by sector, located in close geographic proximity and consists of mostly small and medium sized enterprises. In recent years, clusters of small firms have been viewed optimistically as a source of growth in developing countries. Despite the small size of many of the firms, these clusters make sizeable contributions to developing countries' economies in terms of employment, output, and exports. Therefore clustering is an important aspect of the economies of developing countries.

In the past, there has been some doubt whether small firms could be a potential source of growth in developing countries. A leading undergraduate development textbook is only guardedly optimistic about the potential of small firms in developing countries:

Small scale industry does indeed serve as a breeding ground for potential entrepreneurs...Some firms have the potential to grow to

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medium or even large enterprises. It is important, however, not to yield to romanticism. Statistically, very few small firms even survive over long periods of time, let alone grow up to be medium or large enterprises.¹

While this statement does not preclude the growth of small firms in developing countries, the authors do not seem very confident about their potential. The same textbook cites a positive correlation between GNP per capita and the average size of industrial plants.² This statement seems to imply that there is not much place for small firms in a more developed economy. It overlooks the possibility that new types of industrial organization, such as clustering of small firms, can exist in a modern, industrialized economy. While small firms may suffer certain disadvantages, clustering may mitigate some of these difficulties. For instance, the Sinos Valley, Brazil footwear cluster has at least 75 large manufacturers (each with more than 500 employees) that grew from being small firms over the last 25 years.³ Clustering is an aspect of small firm dynamics in developing countries that has not received sufficient attention.

The available evidence demonstrates that clusters of firms make sizeable contributions to developing countries' economies despite the small size of many or most of the individual firms (see Table-1 for more details). This paper focuses on the theorized benefits of clustering that have been discussed in the case study literature on developing country clusters, and emerging empirical analysis in this area.

Organization of Paper

Sections 2 and 3 of this paper define industrial clusters and summarize some of their common characteristics as described in the case study literature. Section 4 discusses the theorized benefits of clustering, referred to as active and passive collective efficiency. Section 5 presents some of the economic literature related to the study of clusters, and Section 6 presents the conclusions of the paper.

2. Defining Clusters

The major characteristics of the industrial model, as clusters are sometimes called, are described in Rabellotti (1995) as:

¹ Gillis, Perkins, Roemer, Snodgrass (1996), p 498.

² Ibid, p 496.

³ Schmitz (1995), p 13.

- Geographically grouped small and medium sized firms which are specialized by sector;
- Forward and backward linkages based on market and non-market exchanges of goods, information, and people;
- Common cultural and social background linking economic agents and creating a behavioral code, sometimes explicit but often implicit;
- Network of public and private local institutions supporting the economic agents acting within the cluster;

For purposes of this paper, a cluster will be defined as a group of firms located in the same geographic area, such as an industrial district, town, or small region, where there are a significant number of firms specialized in producing inputs for and manufacturing the same type of good. For example, a cluster in Sialkot, Pakistan specializes in surgical goods instruments, while clusters in Sinos Valley (Brazil), Agra (India), and Guadalajara and Leon (Mexico) all produce footwear. Some of the other clusters that have been studied specialize in the production of textiles and leather goods. Within a mature cluster, there are some vertically integrated enterprises, but for the most part, production does not generally take place within one firm. Various separate firms carry out the production process, which includes input production, manufacturing, and complementary services. Many clusters, especially the mature ones, have local business associations as well.

3. Characteristics of Clusters

Clusters are Widespread in Developing Countries

There are a growing number of case studies detailing the characteristics and growth paths of clusters in developing countries. These case studies provide one with a wealth of information about the functioning of clusters, but more fundamentally they demonstrate the prevalence of clusters across sectors and countries. Among the clusters that have been studied include surgical instruments in Sialkot, Pakistan, footwear in Sinos Valley, Brazil, cotton knitwear in Tiruppur, India, woolen knitwear in Ludhiana, India, shoes in Guadalajara and Leon, Mexico, footwear in Agra, India, clothing in Gamarra, Peru, textiles,

ceramic tiles, and metal engineering in Santa Catarina, Brazil, tanneries in Palar Valley, India, and blue jeans in Torreon, Mexico.⁴

Economic Importance of Clusters

Clusters produce a significant amount of output, with a great deal of this output bound for the export market. A few key figures give an indication of the economic importance of clusters in developing countries (more information is provided in Table 1). Pakistan's Sialkot cluster exported \$125 million worth of surgical instruments in 1995-96.⁵ Brazil exported 200 million pairs of shoes in 1993, most of which came from the Sinos Valley footwear cluster.⁶ In Mexico, the two clusters of Guadalajara and Leon comprised 2900 of the 4500 shoe enterprises in Mexico in 1991.⁷ The cluster in Guadalajara alone accounted for 27 percent of the 172.4 million pairs produced in Mexico in 1994.⁸ In Tiruppur, India, there were at least 2000 clustered cotton knitwear firms in 1995, and they produced about 70 percent of India's exports of this commodity.⁹ In Ludhiana, India, there were 10,000 firms and 200,000 workers producing Rs 241 billion¹⁰ (almost \$10 billion in U.S. 1991 dollars) of woolen knitwear in 1991. The Ludhiana cluster contained four-fifths of all woolen knitwear firms in India, producing 90 percent of the country's output of woolen and acrylic knitwear (and 95 percent of the country's exports of this product).¹¹ In Agra, India, 5000 clustered firms were producing 300,000 pairs of shoes per day in 1991-92.¹² Forty-five percent of India's leather is produced in Palar Valley, where there

⁴ Two issues of the journal *World Development* [Vol. 23, No. 1 (1995) and Vol. 27, No. 9 (1999)] were dedicated to the study of clusters in developing countries and each contain a number of case studies. For the Sinos Valley, Brazil, see Schmitz (1995) and (1999); for cotton knitwear in Tiruppur, India, see Cawthorne (1995); for woolen knitwear in Ludhiana, India, see Tewari (1999); for garments in Eastlands, Kenya, metal products in Kamukunji, Kenya, vehicle repair in Ziwani, Kenya, fish in Lake Victoria, vehicle repair and metal work in Suame, Ghana, clothing in Western Cape, South Africa, see McCormick (1999); for shoes in Guadalajara and Leon, Mexico, see Rabellotti (1995) and (1999); for footwear in Agra, India, see Knorringa (1999); for clothing in Gamarra, Peru, see Visser (1999); for textiles, ceramic tiles, and metal engineering in Santa Catarina, Brazil, see Meyer-Stamer (1998), for tanneries in Palar Valley, India, see Kennedy (1999); for blue jeans in Torreon, Mexico, see Bair and Gereffi (2001); and for surgical instruments in Sialkot, Pakistan, see Nadvi (1999).

⁵ Nadvi (1999), p 1611.

⁶ Schmitz (1998), p 12.

⁷ Rabellotti (1995), p 33.

⁸ Rabellotti (1999), p 1574.

⁹ Banerjee and Munshi (2000), p 1, 17.

¹⁰ Tewari (1999), p 1653.

¹¹ Tewari (1999), p 1652.

¹² Knorringa (1999), p 1590.

are at least 600 tanneries in five clusters. Table-1 summarizes some of the information regarding the economic significance of the individual clusters.

Table-1: Economic Significance of Clusters

Cluster	Exports	Production	Employment
Sialkot, Pakistan (Surgical Instruments)	\$125 million of exports in 1995-1996	Most of production exported	300 manufacturers, 2,500 firms total related to surgical instrument industry
Ludhiana, India (Woolen Knitwear)	\$121 million in exports in 1996-97	Produced 90% of India's woolen and acrylic knitwear	10,000 firms, 200,000 workers
Tiruppur, India (Cotton Knitwear)	70% of India's cotton knitwear exports	2.5 billion Rupees turnover in 1985	2000 firms in 1995
Agra, India (Footwear)	n.a.	300,000 pairs of shoes per day in 1991-92	5,000 firms and 60,000 employees
Palar Valley, India (Leather Tanning)	Expected exports in 2000-2001 are 80 billion Rupees	n.a.	600 firms
Sinos Valley, Brazil (Footwear)	\$1.5 Billion in exports in 1997 (current prices) from Brazil, most from Sinos Valley, in 1990, Brazil accounted for 12.3% of <i>world</i> leather shoe exports; Sinos Valley exported 70% of output in 1991.	Approximately 142 million pairs of shoes produced in 1991	391 firms and 83,800 workers in 1996 in footwear; 1673 firms and 170,500 workers in cluster (footwear and related industries)

Guadalajara, Mexico (Footwear)	n.a.	Accounted for 27% of the 172.4 million (or about 46.5 million) pairs of shoes produced in Mexico	In 1990, 23% of footwear employment in Mexico in the state of Jalisco, mostly in the city of Guadalajara. In 1993, there were 1,100 firms and 25,000 employees in Guadalajara alone.
Leon, Mexico (Footwear)	n.a.	n.a.	In 1990, 50% of footwear employment in Mexico was in the state of Guanajuato, mostly in the city of Leon
Gamarra (Lima), Peru (Clothing)	n.a.	In 1993, estimated turnover was \$800 million	In 1993, number of firms estimated between 6800 and 8000

Non-Vertically Integrated Production

Various separate firms in the cluster carry out the production process in stages, which includes input production, manufacturing, and complementary services. In general, production of a final good is not carried out in a single, vertically integrated firm. For example, in Sialkot (Pakistan), in addition to the cluster's core producers, there were various process specialized subcontractors and suppliers of locally manufactured scrap steel.¹³ In the Sinos Valley (Brazil) shoe production takes place in stages that are often carried out in different firms, although some firms were vertically integrated.¹⁴ In the Sinos Valley, there are suppliers that produce a variety of goods and services including raw materials, components, machinery, and services such as freelance design and transport. There also was an extensive use of subcontracting in the Sinos Valley, usually to small firms. In the Agra (India) footwear cluster, there are many input suppliers that produce different components, such as lasts, tools, leather board, soles, laces, stiffeners, and chemicals.¹⁵ Manufacturers in the footwear clusters of Guadalajara and Leon (Mexico) buy their leather and soles from supplier firms.¹⁶

¹³ Nadvi (1999), p 1610.

¹⁴ Schmitz (1999), p 17.

¹⁵ Knorriga (1999), p 1590.

¹⁶ Rabellotti (1999), p 1575.

Exports are Vital to Clusters

Clusters often export a great deal of their output. Pakistan's Sialkot surgical instrument cluster exports virtually all of its output to North America and Europe. The Indian clusters of Agra and Ludhiana used to export a large proportion of their output to the USSR. Exports to the Soviet Union were arranged through government-to-government contracts, and 50 percent of output from the Ludhiana cluster went there. This export channel collapsed along with the Soviet regime, but the clusters recovered quickly by finding new export markets in Europe and North America. In Ludhiana, exports grew from \$32 million in 1991/1992 to \$121 million in 1996/1997. For other data pertaining to cluster exports, refer to Table-1.

Common Cultural Background

In many clusters, there is a common cultural and social background linking economic agents and creating a behavioral code, sometimes explicit but often implicit. This may help to reduce transaction costs and increase the likelihood of cooperation and transfer of knowledge. The case studies of the Mexican footwear clusters in Guadalajara and Leon found that technological cooperation was most likely to occur among firms that were linked by family ties. These firms would trade technological information and exchange machinery. Informal relationships among the firms in Guadalajara and Leon led to subcontracting orders when there was excess demand, so that firms jointly sold products and recovered credits.¹⁷ Informal contacts were also deemed important in the Brazilian cluster, as information was diffused among friends, family, neighborhood, and church.¹⁸ A common cultural background and long history also characterize the Palar Valley (India) leather tanning cluster. It has been in existence since the 19th century, and is dominated by the local Muslim community.¹⁹

Business Associations

Many clusters (especially the mature ones) have local business associations. Sialkot (Pakistan) has three support institutions, the Metal Industries Development Centre, the Sialkot Dry Port Trust, and the Surgical Instrument Manufacturer's Association (SIMA). The local trade associations in Guadalajara and in Leon, Mexico (both called Camara del Calzado) promoted the local trade fair, organized the participation of cluster firms in international exhibitions, and sponsored market studies. These business

¹⁷ Rabellotti (1995)

¹⁸ Ibid, p 12.

¹⁹ Kennedy (1999).

associations are important because they have a role in assisting the cluster firms to cooperate in matters of common interest.

Nature of Relationships in International Markets

For the most part, the design, marketing, and retailing of goods such as those produced by clusters have taken place (and remained) in the developed countries. Cluster firms' goods are sold through various channels, including domestic agents, wholesalers, and foreign agents.²⁰ In the case of Torreon (Mexico), a textiles cluster that has experienced a significant expansion since the introduction of NAFTA, cluster firms have taken over all parts of the production process *except* design and product development, marketing, and retailing. It is believed that the U.S. "lead firms" view these activities as their core competencies, that there are significant barriers to entry, and that these are the highest value-added activities of the production process.²¹ The small cotton knitwear firms in Tiruppur, India sold their goods to agents. These agents gave the small producers access to larger markets than would be otherwise accessible to them, but at the same time blocked the small firms from having direct access to markets as well as exercising control over prices.²²

Many of the clusters have ties to large firms in developed countries. Some German international surgical instrument manufacturers subcontract work to the Sialkot cluster firms.²³ After trade liberalization and the loss of the guaranteed Soviet market, many foreign buyers from U.S. and European retail firms came to Ludhiana (India) to purchase wool knitwear.²⁴ The footwear exports of Guadalajara have also been dominated by U.S. agents.²⁵

Shocks to Cluster Exports

In recent years, many clusters have experienced export shocks. Pakistan's Sialkot surgical instrument cluster faced a crisis situation in 1994 when the United States' FDA (Food and Drug Administration) restricted imports of surgical instruments from Pakistan because they did not meet quality assurance standards (including ISO 9000 certification). These quality assurance standards are intended to ensure the implementation of standardized and accountable quality control processes at each stage of the production

²⁰ Cawthorne (1995), p 50.

²¹ Bair and Gereffi (2001), p 1895.

²² Cawthorne (1995), p 50.

²³ Nadvi (1999), p 1609.

²⁴ Tewari (1999), p 1654.

²⁵ Rabellotti (1999), p 1578.

process, including design, development, manufacturing, and distribution.²⁶ In the late 1980s, trade liberalization in Mexico had a dramatic impact on the footwear industry. Imports increased from 200,000 pairs of shoes in 1987 to 107 million pairs in 1991, and domestic production (in all of Mexico) fell from 245.2 to 199.6 million pairs of shoes.²⁷ The Indian clusters at Tiruppur and Ludhiana had to deal with liberalization of the trade regime beginning in 1991. Average tariffs fell from 142 percent to 40 percent on knitwear within a few years. Trade liberalization also affected Agra's footwear industry. Agra and Ludhiana had an additional challenge in the early 1990s when they lost a large segment of their market consisting of exports to the USSR. Since the late 1980s, the Sinos Valley footwear cluster in Brazil has had to deal with changes in the external environment that have involved great challenges for the cluster. One of these challenges has been increased global competition from China for U.S. buyers. In ten years, U.S. footwear imports from China grew 17 times their 1987 levels.²⁸ At around the same time, U.S. retailers began to place smaller orders to the Sinos Valley firms so that they could maintain smaller inventories. In addition, high inflation in Brazil followed by a currency anchor to the U.S. dollar led to a fall in exporters' receipts.²⁹

Cooperation in Clusters

Cooperation is also an important characteristic of firm clusters. To illustrate, in 1994 when the U.S. FDA restricted imports from Pakistan, SIMA, the local business association in Sialkot, Pakistan, acquired the services of a U.S. quality assurance consultancy (with the financial assistance of the government) to give other cluster firms the training necessary for obtaining quality assurance certification. By the end of 1997, 208 firms were certified as complying with the quality assurance standards, and 153 more firms were either undergoing training or awaiting certification from the FDA.³⁰ A major attempt at horizontal cooperation was attempted, but failed in the Sinos Valley, Brazil cluster. An initiative called the "Shoes from Brazil Programme" was implemented to take action on marketing abroad and in Brazil, reorganize production at the firm level, and improve relationships within the supply chain.³¹ In the Palar Valley, India, two-thirds of the leather tanneries were operating within four years after the Supreme Court issued its order to halt production due to pollution; 80 percent of the tanneries cooperated to build and operate common effluent (pollution) treatment plants. In Guadalajara,

²⁶ Nadvi (1999), p 1606.

²⁷ Rabellotti (1999), p 1571.

²⁸ Schmitz (1998), p 11.

²⁹ Schmitz (1998), p 11.

³⁰ Nadvi (1999), p 1610.

³¹ Schmitz (1998), p 31.

Mexico, the local trade association successfully lobbied the Mexican government for a temporary increase in tariffs when rapid trade liberalization took its toll on the cluster's sales.³² Also in Guadalajara there is a group of exporting firms that exchanges technical information, machinery, and technicians, and discusses availability of inputs.³³

4. Benefits of Clustering: Passive and Active Collective Efficiency

The notion that small firms could benefit from clustering is not a new idea. Alfred Marshall recognized that the grouping together of firms involved in related activities resulted in positive externalities.³⁴ These positive externalities include various perceived benefits from clustering, sometimes referred to as active and passive collective efficiency. Passive collective efficiency refers to benefits accruing to a firm by virtue of being in a cluster.

Each case study article about clusters presents a slightly different list, but the "passive" benefits of clustering can be summarized as follows. Firms in clusters often benefit from *market access*, referring to the fact that clusters often attract the attention of buyers, which improves the chances for firms to sell their products. As a result of the large number of firms operating in the same geographical area, firms have access to a large *pool of (usually skilled) labor*. *Technological spillovers* may occur because technical information can be easily diffused among producers. Specialization and division of the production process by phases leads to *flexibility* that allows firms to take advantage of different economies of scale afforded at different stages of production. This flexible specialization also leads to higher social welfare when firms face idiosyncratic demand uncertainty, as described by Kranton and Minehart (2000). There is also potential for *reduced transaction costs* within the cluster due to the availability of alternate suppliers, repeated interactions between firms, and ease of conveying information on those who renege on contract obligations. Other perceived benefits of clustering are that it helps firms to grow in "riskable steps."³⁵ Since clusters consist of manufacturers as well as suppliers dedicated to the production of specialized inputs, a firm starting up within the cluster can start small and focus on a particular stage of the production process or produce a single specialized input for other firms.³⁶ This significantly reduces start-up costs and lowers barriers to entry from credit constraints.

³² Rabellotti (1999), p 1579.

³³ Rabellotti (1999) p 1579.

³⁴ As quoted in Schmitz and Nadvi (1999), p 1504.

³⁵ Schmitz and Nadvi, p 1503.

³⁶ Ibid, p 1505.

Active collective efficiency, on the other hand, stems from purposeful cooperation between the firms of the cluster and can be further divided into the sub-categories of horizontal cooperation (also called joint action) and vertical cooperation.³⁷ Many clusters have business associations whose role it is to support the cluster, and these associations may have a role in fostering cooperation within the cluster. Due to the shocks to exports faced by many of the clusters, there has been a need for upgrading within the clusters.³⁸ There are three major ways that individual firms or clusters may upgrade, and the firms' capacity to upgrade is often dependent on their ability to cooperate or engage in active collective efficiency.

First, firms may engage in *process upgrading*, which consists of reducing costs either by re-organizing production or by implementing new technology. The second type of upgrading is referred to as *functional upgrading*, leading to a greater involvement of manufacturers in the design and marketing process. The last category of upgrading, *product upgrading*, entails producing more sophisticated (higher value-added) goods.

The first type of upgrading, process upgrading, can involve a transformation of firms' relationships with their suppliers, which can also be described as "vertical cooperation." Upgrading may take the form of introducing new production technologies (such as new machines) or may be a reorganization of production relationships using the same production technology. Whatever forms the upgrading takes, the desired result is generally higher and more reliable quality and shorter delivery times in the processing of orders which often come from foreign buyers.

The second and third type of upgrading may necessitate joint action or "horizontal cooperation" between the firms of the cluster. This is especially true in the case of clusters because most of the firms are too small to make the necessary investments to carry out the activities of product development, marketing, and retailing individually. One must also consider the fact that international buyers are already established members of the market structure. Joint action by the cluster to break into the activities traditionally carried out by foreign buyers is likely to be opposed.

³⁷ Ibid, p 1504-5.

³⁸ Ibid, p 1507.

5. Literature Review

Case Studies and Other Literature on Active Collective Efficiency and Cooperation among Clustered Firms

The majority of the case studies on industrial districts or clusters stress the need for joint action to overcome the new commercial pressures that many of the clusters have faced due to trade liberalization (Mexico, India), quality or environmental standards (Pakistan, Palar Valley India), increased global competition (Brazil), or loss of traditional markets (India).³⁹

In Sialkot, Pakistan⁴⁰ a cluster of firms consisting of approximately 220 producers and 1500 subcontractors produces surgical instruments mainly for foreign markets in the United States and Western Europe. The cluster exported \$124 million worth of goods in 2000-2001.⁴¹ Since doctors and hospitals in the U.S. often purchase disposable surgical instruments as “kits,” or packages of surgical instruments that are sterilized and specialized for use in particular medical procedures, a new joint action initiative has been proposed including a plan for these kits to be produced locally and sold directly to hospitals, rather than through a third party.

In a case study of woolen knitwear in Ludhiana, Tewari attributed the recovery of the cluster (after the collapse of the Soviet market) to the cluster’s strong presence in the domestic market. The large and medium sized firms created brands of their own (in other words, product upgrading) for the domestic market that were of higher quality than those exported to the Soviet Union. This attention to design and quality for the up-scale domestic market made for an easier transition to exporting to the developed nations. In addition, production for the Indian domestic market functioned as an insurance mechanism for firms attempting to enter new export markets. Therefore, according to Tewari’s interpretation, the domestic market can play an important role as both a learning opportunity as well as an assured market for its goods (at least until trade liberalization progresses further).

Rabellotti (1995, 1999) examined clusters of shoe producers in Mexico. The first study (1995) compared shoe clusters in Guadalajara and Leon to clustered shoe producers in Italy. This paper found backward linkages (in other words, relationships between manufacturers and their suppliers) to be stronger in Italy than in Mexico, but found that forward linkages (into marketing and commercialization) were weak in both Mexico and Italy. Her case study also determined that informal relationships took on a greater significance in the

³⁹ Schmitz and Nadvi (1999).

⁴⁰ Nadvi (1999).

⁴¹ SMEDA (2001), p 13.

Mexican clusters than in the clusters in Italy. Rabellotti's second study (1999) focused on the Guadalajara cluster and how inter-firm relationships were affected by trade liberalization. This study found (using subjective survey instruments) that firm performance was positively correlated with vertical and horizontal cooperation. In addition, approximately half of the firms cooperated with their suppliers in matters such as information exchange, negotiation of payment and delivery conditions, joint product development, quality improvement, and delivery time.⁴² On the other hand, there was evidence that vertical cooperation was still lacking in many respects, despite the pressures of increased competition in international markets. For example, the survey found that manufacturers continued to have delivery problems with suppliers.

Schmitz (1995, 1999) investigated issues of cooperation in the Brazilian footwear cluster of the Sinos Valley. The first case study documented the history and growth of the cluster from the 1960s to the 1990s. During this period, the cluster grew from a protected infant industry producing for the domestic market into a powerhouse exporter with a substantial share of the world market for shoes.⁴³ Export agents, especially from the United States, played a large role in the development of the cluster as a major exporter. Cooperation among the firms has ebbed and flowed over the last thirty years. Prior to the 1970s, trust and cooperation founded in a common social identity (German emigrant heritage) was strong. During the 70s and 80s, this cooperation waned as the cluster experienced rapid growth, but then re-emerged in the 1990s. The second study (1999) explored the recent initiatives for cooperation in the Sinos Valley in more detail. Greater cooperation between manufacturers and intermediate input producers improved the quality of goods and decreased delivery times and batch sizes of the footwear in response to the demands of foreign buyers in the U.S. Since the late 1980s however, the cluster has been faced with increased competition from China for U.S. buyers. The "Shoes from Brazil Program," a major joint action initiative to improve marketing abroad, failed because the largest five exporting firms (that were vertically integrated and had a close relationship with the largest U.S. buyer) opposed the plan and undermined it by exerting their influence in the shoe manufacturers' association, Abicalcados.⁴⁴

A related area of research is the study of Global Commodity Chains. Global Commodity Chain (GCC) or global value chain analysis⁴⁵ takes into

⁴² Rabellotti, (1999) p 1575.

⁴³ Brazil's exports claimed over 12 percent of the world footwear market, and the Sinos Valley produced the majority of these exports.

⁴⁴ Schmitz (1998), p 34.

⁴⁵ Gereffi uses the term "Global Commodity Chain" while Humphrey and Schmitz use the term "global value chain".

account the fact that the design, production, and marketing of products is a chain of activities that do not necessarily occur within the same firm.⁴⁶ While this definition refers to a general phenomenon, GCC and global value chain analysis have also been applied to the relationships between clusters and foreign buyers. In some cases, such as the ones examined here, the value chain extends across national borders. Developing country clusters are often part of “buyer-driven commodity chains,” as defined by Gereffi. According to him:

Buyer-driven commodity chains refer to those industries in which large retailers, marketers, and branded manufacturers play the pivotal roles in setting up decentralized production networks in a variety of exporting countries, typically located in the third world. This pattern of trade-led industrialization has become common in labor-intensive, consumer goods industries such as garments, footwear, toys, housewares, consumer electronics and a variety of handicrafts. Production is generally carried out by tiered networks of third world contractors that make finished goods for foreign buyers. The specifications are supplied by the large retailers or marketers that order the goods...these companies design and/or market – but do not make – the branded products they order. They are part of a new breed of ‘manufacturers without factories’ that separate the physical production of goods from the design and marketing stages of the production process.⁴⁷

The implication in the previous quote is that developed country firms “govern” or basically exercise control over the global commodity chain, even in the absence of ownership of the stage firms. The question then arises: Do the buyers (usually from developed countries) control the value chain to an extent that inhibits upgrading of the cluster into the services of marketing and retailing? Some of the authors who have written about industrial clusters in developing countries have expressed concern that the clustered firms producing goods for large multinational firms will become trapped in a subordinate role of low value added production while the multinationals that produce the designs and do the marketing and retailing will take the majority of the profits.

However, since the firms being studied here are geographically clustered, specialized in the same sector, and often have their own business

⁴⁶ The literature on cluster case studies and the literature on value chain analysis have evolved somewhat differently. According to Humphrey and Schmitz (2000), the cluster case studies have focused on interactions within the cluster, such as local level governance and cooperation, while value chain analysis emphasizes links with the outside world and pays less attention to the role of local cooperation between firms.

⁴⁷ Gereffi (1999), p 4.

associations, the possibility arises that clustered firms may be able to cooperate in order to break away from the foreign buyers and produce their own designs or do their own marketing in order to gain a greater share of producer surplus.⁴⁸ As was discussed above, the industrial clusters in the Sinos Valley (Brazil) and Sialkot (Pakistan) have both attempted joint action initiatives, with mixed results.

Thompson (2005a) developed a theoretical model to examine the conditions under which clustered firms in a less developed country may cooperate in a “joint action” to market their output in a developed country. The joint action eliminates the role of an intermediary firm in the developed country. The clustered firms are heterogeneous in expected quality of output. The clustered firms know the quality type of other firms, but the foreign intermediary does not. The intermediary, however, has a lower marketing cost than the clustered firms. The main result of the model is that joint action can occur among high quality type firms. The low quality firms on the other hand always use the foreign intermediary to distribute their output. The model also shows that joint action is more likely to take place when the size of the cluster, the probability of producing high quality by the high quality firms, and the final market price of the good are high, and when the marketing cost is low.

Thompson (2005b) empirically examined the firm-level characteristics that determine the clustered firms’ interest in intra-cluster cooperation to market their own goods, using data collected from the surgical instrument cluster in Sialkot (Pakistan). The results demonstrated that firms were more likely to be interested in such initiatives once they already had some direct experience in marketing and when firms had a lower opportunity cost of leaving their current customers, where opportunity cost was measured by the length of the trading relationship.

Literature on Transaction Costs, Relational Contracting and Passive Collective Efficiency

Weak contract enforcement institutions characterize many of the developing countries where industrial clusters are found. In environments where an effective legal system or formal system of contract enforcement is lacking, individuals and firms rely on informal means to enforce agreements, also referred to as relational contracting.⁴⁹ The three major methods for

⁴⁸ See Humphrey and Schmitz (2000), Kaplinsky (2000), Schmitz (1999).

⁴⁹ Relational contracting or informal enforcement may not necessarily be a substitute for the judicial system; in fact they might be complements.

informal contract enforcement include: i) dealing only with trusted parties such as friends and family members, ii) contracting repeatedly with the same parties (so that the value of the relationship prevents cheating), and iii) community enforcement (where the threat of sanction by a third party ensures that an agreement is upheld).⁵⁰ Depending on the characteristics of a particular geographic area or grouping of agents, one of these methods may be more effective than the others in supporting contract enforcement. For example, since clustered firms all produce similar goods and are geographically concentrated, community enforcement might be a stronger force than bilateral relationships. If community enforcement is not present, the threat of sanction by an individual supplier in the cluster would most likely be ineffective since there are many other similar suppliers.

Banerjee and Munshi (2000) presented a theoretical model and empirical testing of social network-based lending, comparing the investment and earnings profiles of migrants and established producers in the Tiruppur knitwear cluster. They found that the established producers belonging to the Gounders caste, with access to cheaper informal credit through a social lending network, had lower output growth but invested more at all levels of experience as compared to the migrants. The migrants, with less access to informal credit networks, invested less even though they have higher ability.

Ilias (2001) focused on the role of family labor in the Sialkot surgical instrument cluster and the distortionary effects of the decision to use family versus non-family labor. He concluded that there existed a labor market distortion such that family managers were preferred to non-family and therefore firm output was correlated with family size.

Woodruff (1998) studied clustered firms in the Mexican footwear industry. His study summarized the results of surveys conducted in Guadalajara and Leon and provided a qualitative analysis of the effect of trade liberalization on contract enforcement in the two clusters. He found that prior to trade liberalization, manufacturers relied on reputation mechanisms rather than the courts to enforce agreements with retailers. Once trade liberalization was underway, manufacturers were powerless to use sanctions to enforce contracts with retailers because the retailers had access to alternate supplies through the world market. Retailers cancelled orders, causing some of the cluster firms to go bankrupt since there was no longer a need for the retailers to maintain a good reputation in the cluster. In this way, trade liberalization weakened relational contracting.

⁵⁰ Community enforcement requires that information about cheaters is known throughout the community, and that members of the community refuse to trade with known cheaters.

Thompson (2005b) tested an idea from relational contracting theory (Macaulay 1963, North 1990, Greif 1994, Kranton 1996) that informal relationships could substitute for formal contract enforcement through the judicial system, using data collected from the surgical instrument cluster in Sialkot (Pakistan). Inter-firm trust is thought to lead to reduced transaction costs (a passive benefit of a cluster). The study considered exchanges of goods between clustered suppliers and their customers, who were either members of the cluster or firms that interacted frequently with it. Inter-firm trust was measured as the amount of trade credit offered to customers⁵¹. The results showed that suppliers were more likely to offer trade credit when they believed in the effectiveness of formal contract enforcement and when they participated in business networks (proxied by inter-firm communication). There was also some evidence that customer lock-in (as measured by the duration of trading relationships) helped to develop inter-firm trust since firms gave more credit when relationships were of longer duration. This is because locked-in customers were typically less able to find alternate suppliers, and therefore less likely to renege on contracts.

6 - Conclusions

Industrial clusters provide employment for large numbers of people in developing countries, and have become significant exporters. Case studies highlighting the successes of developing country clusters in these respects have led to enthusiasm on the part of development practitioners about the prospects of clustering as a strategy to promote private sector development and reduce poverty. However, the relational contracting results in Thompson (2005b) are qualitatively (and in some cases quantitatively) similar to those obtained in studies of non-clustered firms.⁵² Furthermore, social network-based relationships in clusters have been shown to have distortionary effects, as documented by Ilias (2001) and Banerjee and Munshi (2000). Therefore, policies to promote the development of industrial clusters should consider both the benefits and the drawbacks of clustering, and incorporate the lessons learned from these studies.

⁵¹ The survey instrument was adapted from the one developed in McMillan and Woodruff (1999) and Johnson, McMillan, and Woodruff (2002) to study relational contracting among (non-clustered) firms in Vietnam and Eastern Europe (respectively).

⁵² This is only a tentative conclusion based on a comparison of the coefficient estimates of similar regressions conducted of clustered (Sialkot, this study) and non-clustered firms (Vietnam, McMillan and Woodruff (1999)). We cannot directly compare the magnitudes of coefficients because there was not a joint regression of clustered and non-clustered firms. Conclusive results comparing contract enforcement of clustered versus non-clustered firms would require further study.

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