



**Industrial Clusters and Networks:  
Case Studies of SME Growth  
And Innovation**

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## **Introduction**

Encouraging the growth of small and medium enterprises (SMEs) is widely seen as being an important plank of industrial policy in many developing countries. Concerns that motivate state-backed SME support programmes range from the laudable aims of creating jobs, improving welfare, alleviating poverty, raising incomes, enhancing technical and entrepreneurial capacities as well as the often expedient, political, considerations of fostering key constituencies in civil society. The emphasis that has come to be placed on SMEs is also associated with the failure of the large scale manufacturing sector in meeting many of these objectives and fulfilling the hopes and aspirations of modernisation and growth theorists. The decline of the so-called “golden age of capitalism” set into motion various forms of economic restructuring. In industry this has taken the shape of a move away from Fordist to flexible systems of production, an emphasis on down-sizing and a recognition that SMEs are a key, and not as previously thought peripheral, component of the production system.

Despite the growing awareness that SMEs are integral to industrial development, strategies aimed at supporting them have tended, more often than not, to fail. Success stories exist but are rare. This causes pause for concern. Where are the researchers, policy-makers and the development practitioners going wrong? This paper reviews some cases of SME successes from the South. What distinguishes these cases, and the framework of this paper, is that these successes relate not to individual SMEs but to the collectivity of SMEs. The paper is concerned with small producers that operate within two distinct “institutional” settings: industrial clusters, made up of geographically concentrated and sectorally specialised enterprises; and industrial networks, that link together geographically dispersed producers and other agents. This paper explores how clustering and networking can enhance economic growth and spur technical progress in SMEs.

These forms of industrial organisation suggest growth paths for SMEs that go well beyond the simple survival and employment generation strategies associated with the informal sector and traditional SME development policies. In industrially advanced countries clusters and networks are central to the industrial restructuring framework associated with notions of “flexible specialisation” and the “new competition” (Piore & Sabel 1984, Best 1990). Schmitz (1989) has argued that such forms of industrial organisation may also be important for SMEs operating in the labour surplus environments of developing countries. This is borne out in a review of small firm clusters and industrial networks in the South by Nadvi & Schmitz (1994). Although experience is mixed, it appears that such forms of industrial organisation offer Southern SMEs the possibility of competitiveness on grounds that go beyond cheap labour.

Nadvi & Schmitz's review also finds, not surprisingly, that experiences in the South differ from those of SME clusters in the industrially developed North. None of the Southern cases that they cite follow the exact contours found in the classic examples of industrial districts from the so-called Third Italy (see Pyke, Becattini and Sengenberger 1990). They suggest, that positing cluster growth paths around a binary framework of "high" (technically innovative and quality conscious) and "low" (cheap labour and technically stagnant) roads, as proposed by Sengenberger & Pyke (1991), needs to be revised. While some SME clusters in the South are firmly entrenched on the low road, others display evidence of aspects of the high road alongside elements of the low road.

The conclusion that emerges is that industrial clustering and networking can be of great importance to small firms in the South operating in environments that are industrially and infra-structurally underdeveloped. Clusters offer SMEs, at the very least, external economic advantages, including economies of scale and of scope. Co-operation between agents within clusters and networks, through the sharing of information, resources, knowledge and technical expertise, and other forms of joint action reduce transaction costs and further enhance competitiveness as well as accelerate learning and technical innovation. Finally, while there is evidence that inter-firm relations, set in motion by clustering and networking, offer a potential growth path that takes SMEs beyond a survival strategy to one of real, competitive and sustainable growth; it is also clear that structures and forms of organisation associated with clustering and networking are themselves in a state of flux, continuously undergoing change. This emphasises the need for a dynamic and continuous analysis.

If industrial clusters and industrial networks offer a potential for Southern SMEs to upgrade their products and processes and compete in demand elastic domestic and international product markets, the question that has to be posed is: How do they do it? Moreover, what are the characteristics of these forms of industrial organisation? How does co-operation take place between firms and other agents such as input suppliers, specialist subcontractors, service providers and buyers? How is technical learning and innovation enhanced? What roles do private sector bodies, particularly trade associations and common service centres, as well as public sector institutions and government policy, play in facilitating the development of innovative clusters and networks of SMEs?

To address these questions, the paper reviews the following case studies (undertaken by others) of industrial clusters and networks in the South:

Region	Country	Location of Cluster	Sector
Latin America	Brazil	Sinos Valley	Shoes
	Mexico	Guadalajara & Leon	Shoes
South Asia	India	Tirrupur	Cotton Knitwear
	India	Bangalore	Engineering & Electronics
East Asia	Korea	Chaebol (large firm - small firm) Networks in Seoul	Electronics

These cases have been selected for a number of reasons. First, they provide a wide regional coverage. Second, they include some of the more dynamic experiences of growth and competitiveness in local and global markets by Southern SMEs in recent years. Third, these cases indicate both diverse growth paths, as well as common lessons regarding the development of the clusters and networks. Fourth, these case studies represent some of the best researched studies on SME clusters and networks which aimed to identify how such forms of industrial organisation brought about competitiveness, technical innovation and growth for small firms in the South.

In reviewing these experiences of SME clusters and networks, each of which can be read as a stand alone section, the objective is to understand: their main characteristics; forms of production organisation and strategies of co-operation that raise efficiency and upgrade skills and technologies; and, the role of institutions, both local associations as well as government support bodies, in facilitating the organisational and technical learning strategy and furthering the growth of these industrial clusters and networks. While the initial idea was to pursue the same questions for each case study, in practice, this has proven difficult because the coverage in the available material is uneven. Nevertheless, the final section of the paper draws together some of the common findings from these diverse studies, and suggests lessons for policy.

Among the lessons which warrant the attention of SME policy agents are the following: First, creating clusters or networks by fiat is unlikely to be a successful strategy. However, such forms of organisation, once emerged, can often be encouraged and strengthened through external interventions. Second, within intervention strategies it is worth remembering that while the focus is on SMEs, large firms can, and often do, play an important role in the development of industrial clusters and networks. This implies a greater attention to the nature of ties between large and small firms within clusters and networks. Third, the development

path of industrial clusters and networks is closely tied to the prevailing dynamics of the market for which these clusters and networks produce. Thus market agents, local traders and foreign buyers, as well as institutions that facilitate the interface between producers and the market (such as trade fairs) will have a core function in improving flows of technical and marketing know-how, providing quality and fashion feed-back, and enhancing the competitiveness of clustered and networked producers. This last point is of particular importance in the context of current trends in trade liberalisation and increased globalisation of production wherein small firms are having to survive in ever more competitive environments. In such a context, achieving sustained growth for SMEs is not only a function of production efficiency but also of the ability to continuously innovate and technically develop. Clusters and networks may offer SMEs a viable production organisation strategy to bring about such sustained competitive growth.

## CASE STUDY 1: THE BRAZILIAN SHOE CLUSTER OF SINOS VALLEY

### 1.1: Introduction

In 1992 Brazil ranked as the world's third biggest exporter of leather shoes. Its share of global trade in leather shoes rose from 0.5% in 1970 to 12.3% in 1990. Annual growth in export volumes of Brazilian made leather shoes during these two decades was 24.1%. In other words, export production doubled every three and a quarter years. Within Brazil the most dynamic export performance came from the state of Rio Grande de Sul which, although accounting for only 30% of Brazil's total leather shoe production, manufactured 80% of its shoe exports. Within this state, the small towns of the Sinos Valley, located within a radius of 50 kilometres of Novo Hamburgo, constitute the centre of Brazil's export oriented shoe industry.

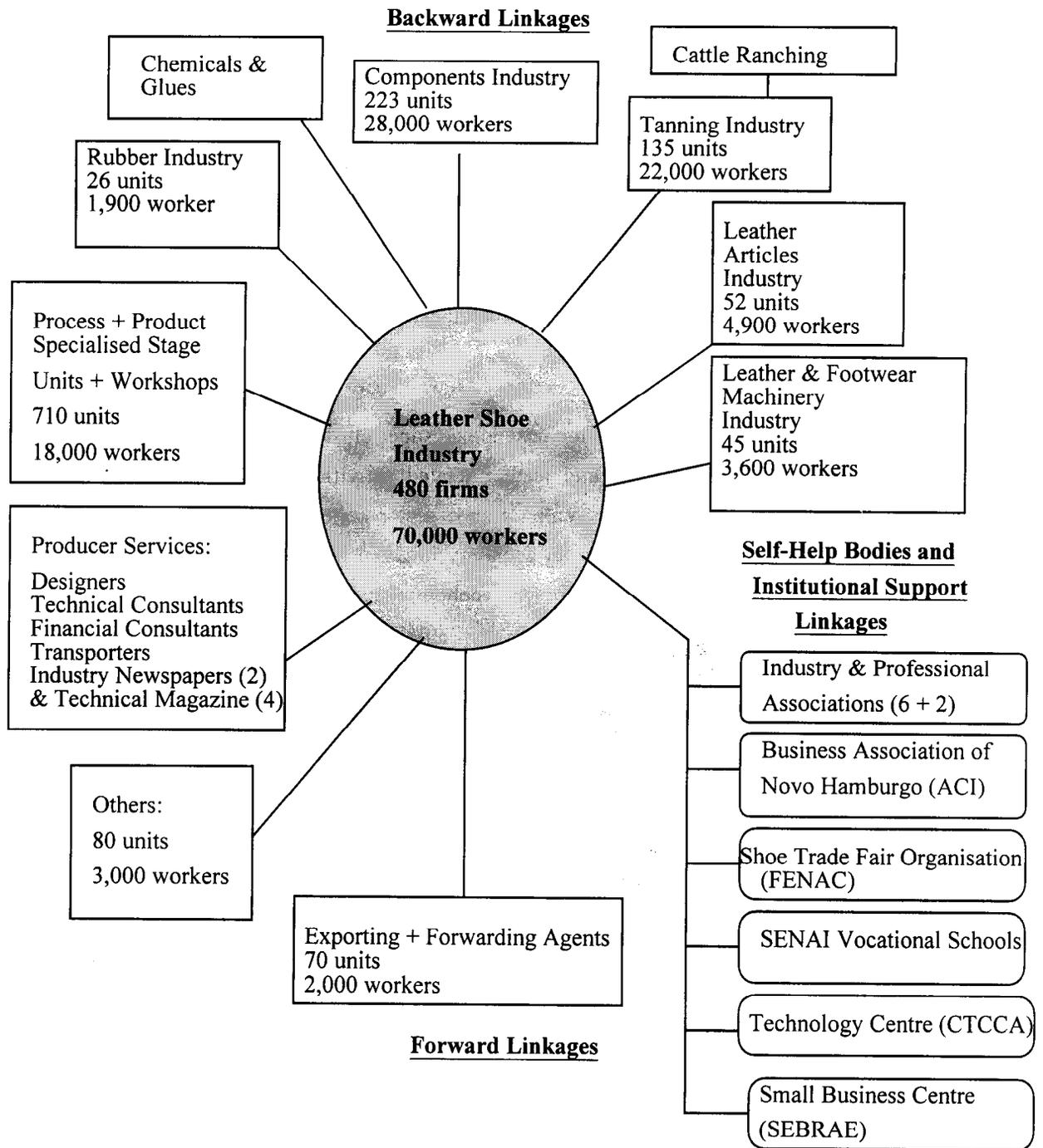
This small region, described as a shoe producing "super cluster", is almost wholly geared to various aspects of shoe making and leather related activities. The 1,800 odd firms, and 150,000 persons engaged in Sinos Valley's shoe sector collectively export close to US\$ 1 billion a year (Schmitz 1995a).<sup>1</sup> In an economy blighted by years of economic crises and stagnation, the region stands out for its economic success and growth. For example, employment in the State's shoe sector grew by 280% in the decade of the Seventies and by 80% in the Eighties. Approximately 70% of the Sinos Valley cluster's production is exported, largely to the United States. At the heart of this success lies an industrial organisation system associated with sectoral clustering. This has not only generated locational externalities but also led to forms of inter-firm collaboration that have raised the cluster's collective competitiveness.

The review of the Sinos Valley shoe cluster draws heavily on the primary research carried out by Schmitz (Peasgood & Schmitz 1994; Schmitz 1995a; 1995b), and Ruas et.al. (Ruas et. al. 1994). It consists of three parts. First, an overview of the main characteristics of the cluster, the nature of its product market, and the pattern of the cluster's development is detailed. Second, the cluster's system of industrial organisation is outlined to probe how inter-firm relations at the level of backward and forward ties, both within and outside the cluster, have brought about an upgrading in performance, skills and technologies. The final part details how public and private sector support institutions have influenced inter-firm relations in the cluster and facilitated the cluster's technical development.

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<sup>1</sup> Russ et. al. (1994) suggest annual exports of shoes from Sinos Valley was even higher, with US\$ 1.8 billion in 1990.

**CLUSTER MAP OF THE SINOS VALLEY SHOE INDUSTRY**



Total Number of Firms: > 1,800  
 Total Number of Workers: > 153,000  
 Total Exports: US\$ 900 million (1992)

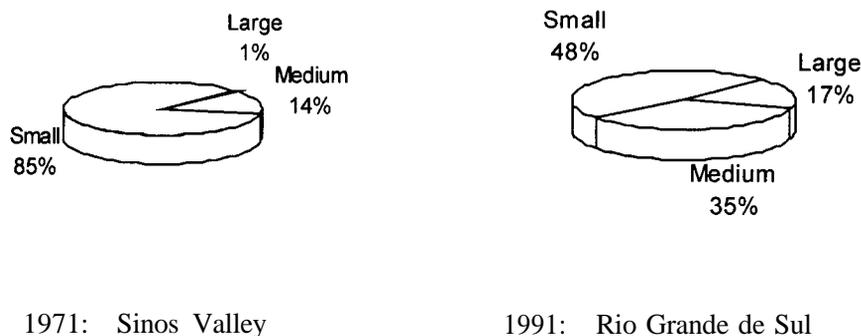
[Source: Based on Schmitz 1995a]

## 1.2: Main Characteristics of the Cluster

The cluster map above provides an overview of the composition of the Sinos Valley shoe cluster. Alongside the approximately 500 shoe producers that make up the core of the cluster, there are over 700 stage units and a further 700 ancillary agents.

At the centre of the cluster are 480 shoe producers. Of these, in 1991, 48.2% were small firms, 34.6% medium sized, and 17.3% large units.<sup>2</sup> As seen below, the proportion of small firms has declined sharply since 1971. However, as Schmitz notes, the large firms of today were small two decades ago, and central to their growth was the location in a cluster with deep forward and backward linkages. Today there are important distinctions between large and small firms in this cluster. For example, the former tend to produce for export markets, the latter are more likely to cater to domestic consumers. Similarly, large firms are more vertically integrated in production than small firms. Moreover, large firms appear to have benefited more than small firms through the intervention of local support institutions. Although recent trends suggest a pattern of downsizing and reorganisation of production in favour of smaller units, there is an underlying sense that in the Sinos Valley cluster large and small firms co-habit rather than actively engage with each other in production. Nevertheless, all sizes of firms share in, and contribute to, the cluster's dynamism.

**Chart 1.1: Size distribution of shoe producers in Sinos Valley/ Rio Grande de Sul, 1971- 1991**



Source: Based on Schmitz 1995a

Schmitz puts forward three factors as being particularly germane to Sinos Valley's economic success. These are: first, backward linkages that shoe producers have with local suppliers of inputs, machinery and producer services; second, forward linkages between producers and

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<sup>2</sup> Schmitz (1995a) defines small as firms with 100 workers or less. Of these, firms with up to 10 workers are "very small". Firms with over 500 workers are considered large.

buyers, especially export agents; and third, the strategic intervention of local support institutions in facilitating the cluster's ability to "shift gear" and move into higher value added product markets.

Sinos Valley is distinguished from other shoe producing centres in Brazil by the wide range of local suppliers of inputs, raw materials, and new and second-hand machinery; specialised stage firms and shoe component producers; as well as specialist providers of managerial, financial technical and information services critical to the industry. The local cattle ranching sector of Rio Grande de Sul, with a "cattle herd of 25 million heads", supplies the footwear industry with leather (Ruas et. al. 1994:5). Within the confines of the Valley, "most inputs are produced: uppers, soles, heels, insoles, insocks, shanks, glues, nails, eyelets, dyes, etc., -all of them made to many different technical specifications. In addition, most of the machines that turn these materials and components into shoes are made locally. Roughly speaking, for every job in shoe manufacturing there is a job in the local supply industry. The Sinos Valley also contains a wide range of specialised producer services. These include: freelance designers, technical and financial consultants, and specialised transport services" (Schmitz 1995a:11-12). Furthermore, local information flows are facilitated by the publication of two weekly newspapers and four monthly technical magazines within the Valley, all of which specialise in the shoe industry.

Along with the depth of backward linkages in the cluster, there are 70 locally-based export agents. Some of these represent leading US retailers while many other agents, both Brazilian and foreign, connect local producers to outlets in Europe as well as Brazil. To understand the significance of export agents to the cluster, one needs to understand the nature of the product market in which the cluster operates. Sinos Valley produces women's leather shoes for highly competitive, demand-led, domestic and international markets. Emphasis is placed on consistently high standards of quality and on designs that keep pace with rapidly changing fashion trends. Design and fashion in the domestic market parallel (or follow) those in the US. Consequently, export agents, both local and foreign, play a crucial function as intermediaries between producers and fashion conscious retailers. They act as enforcers of quality and as the generator of new ideas.

Local support institutions, as well as trade associations, have also had an important part in facilitating the cluster's ability to qualitatively shift in terms of technical and skill capacities as well as in breaking into export markets. The Sinos Valley cluster has six trade associations that represent the specific interests of a range of activities related to shoe producing and carried out within the cluster. The following are the associations of: shoe producers (ABICALCADOS); tanners (AICSUL); component producers (ASSINTECAL); machinery

(ABICALCADOS); tanners (AICSUL); component producers (ASSINTECAL); machinery suppliers (ABRAMEQ) and export agents (ABAEX). In addition there is the local Business Association of Novo Hamburgo (the ACI). Other important support institutions are the local shoe trade fair organisation, FENAC, set up in 1963 by manufacturers in conjunction with local municipal authorities; vocational schools (SENAIs) providing training in tanning (the only one of its kind in Latin America), chemistry and mechanics, and in shoe design and manufacturers. Finally there is a local technology centre for the leather shoe industry (CTCCA).

Schmitz (1995b) describes the cluster's development as consisting of three phases with two key turning points that have influenced the cluster's growth trajectory and organisational structure. The first turning point dates to 1968-69 and is associated with the opening up of export opportunities in a cluster which had until then been producing solely for the Brazilian market. The second turning point came some two decades later in 1987-88 and consisted of two aspects, both of which worked on the cluster in similar ways encouraging restructuring of production organisation and a greater concern for quality and flexibility. One was what Schmitz calls the "Chinese Shock" and the other the "Discovery of Inventory Costs" (Schmitz, 1995b:546). Pressure from cheaper Chinese-made shoes in the US market during the mid to late 1980s led to attempts by Sinos Valley producers to diversify exports, in particular to penetrate into higher quality markets in Western Europe. Furthermore, competitive pressures also heightened the search for greater efficiency. In keeping with industrial reorganisation strategies in the North, attempts were made by retailers (particularly in the US, but also in Brazil) to reduce costs by reducing inventory stocks, placing smaller orders and emphasising greater quality control. In recent years, these externally induced competitive pressures on Sinos Valley shoe producers have led to a re-emergence of local inter-firm co-operation, particularly through associations and support institutions. Such collaboration had declined during the export boom years of the 1970s and early 1980s.

The first phase, pre 1968-69, was one of import substitution in which local producers in the Sinos Valley manufactured for the local market and out competed other shoe-producing regions in Brazil. While tariff barriers protected the industry, local competition encouraged some element of efficiency, supported by the extensive backward linkages already prevalent in the cluster and which provided the predominantly small firms of the cluster with significant external economies. The presence of extensive backward linkages and well-developed product capacities were a key factor that encouraged US buyers seeking low-waged shoe suppliers to initiate purchasers from the cluster in the late 1960s. Furthermore, FENAC, the local trade fair organisation, played a critical part in popularising the cluster's products by inviting foreign buyers to visit the local trade fair and by financing visits by local

producers to the United States and Europe in search of export orders. Thus, in a matter of a few years, a cluster of local producers, most of them small, was plugged into a distant “mass market” (Schmitz 1995a:14, emphasis added).

The nature of the mass market meant that during the export boom, successful firms expanded by internalising production and adopting Fordist systems of mass production. The cluster grew, patterns of local inter-firm co-operation declined while ties with external buyers took precedence. The “Chinese Shock” of the late 1980s led to a reassessment of the Fordist system of organisation. Furthermore, retailers moved from single bulk orders to multiple small orders. Consequently, stocks held by Brazilian shoe exporters declined to a third or less of previous norms (down to 1 month orders), factories down-sized, and increasing emphasis was placed on cellular production, higher quality and diversified exports (ibid: 15).

To summarise, Schmitz states that “the way [that] the [Sinos Valley] cluster has developed and the way production organisation has been shaped -above all- by markets” (ibid.13). External influences led the cluster’s production organisation to shift from import substituting craft production in the 1960s to Fordist mass production and export growth in the 1970s, and to the more recent experience of a relatively flexibly specialised form of production organisation that stresses high quality, low inventory costs, niche markets and quick delivery schedules. These changes split the cluster into two distinct components: export oriented, and relatively integrated large firms on one side, and small firms catering to the local market and more reliant on local supplier and subcontractor networks on the other. The most recent trends suggest, however, that this binary dichotomy is beginning to fade. Large firms are downsizing and reorganising production along cellular lines while smaller firms are gaining greater access to export markets.

### **1.3: Patterns of Industrial Organisation and Technical Learning**

What does the emerging form of production organisation within the cluster, and for that matter production systems associated with the cluster’s development, mean in terms of relations with buyers, suppliers and other local producers? Moreover, how have these ties encouraged technical upgrading of skills, technologies and products? In order to address these questions, this section reviews backward and forward ties in the Sinos Valley cluster.

## **Backward Ties**

The presence of raw material suppliers and input manufacturers within the cluster was cited as a key locational advantage by almost all of the 51 small shoe producers sampled in the industry by Schmitz (Peasgood & Schmitz 1994:41). The vast majority of the 24 medium and large firms surveyed in the cluster by Ruas et. al. also reported relying upon, and being satisfied with, local input suppliers (Ruas et. al. 1994:8).

During the Fordist era, there was a tendency among some large firms to vertically integrate production. A few internalised “the final processing of leather. In other cases entire tanneries were acquired. Expansion into production of rubber and plastic components also took place” (Schmitz 1995a: 16). In contrast, small and medium sized firms in the cluster remained reliant on the local supplier and subcontracting networks. For large firms, internalisation ensured control over, and availability of, high quality materials (especially leather) to feed mass production needs. Backward integration also provided a channel for the profitable reinvestment of surpluses (Schmitz 1995a: 16). In contrast to SMEs, subcontracting and the local presence of input suppliers lowered costs, generated externalities and enhanced efficiency, while machinery suppliers and repair workshops played an important role in diffusing information throughout the cluster (Peasgood & Schmitz 1994:30).

More recently, as external market pressures demanding greater flexibility and higher quality erode the Fordist system of integrated production, ties between producers and suppliers, for both large and small firms, have gained in importance. One example is that “whereas in the past conflict [between producers and suppliers] resulted in blame and the switching to different suppliers/customers, there are now some attempts to explore problems jointly” (Schmitz 1995a:16). Another example of vertical collaboration is that of a large producer which “had embarked on a collaborative strategy with 60 suppliers of raw materials and components. A number of other shoe manufacturers had started similar initiatives” (ibid. 25-26). Ruas et. al. (1994) found that while technical interactions were generally weak between larger shoe producing firms and input suppliers in the cluster, a particularly close technical relationship had developed between shoe firms and chemical component producers. The latter were “seeking advice regarding the best manner to adapt their products to the clients’ specific needs” (Ruas et. al. 1994:9).

With the downsizing of production orders and demands for greater flexibility, there are suggestions that subcontracting may rise for both small and large firms, although the need for greater control of quality could also lead to the opposite tendency, especially in quality critical stages of shoe production. Nevertheless, subcontracting is described by Ruas et. al. as “a fundamental component of the whole production system” of shoe manufacturers in Sinos

Valley. Each of the 24 larger and medium sized firms surveyed by Ruas et. al. relied extensively on subcontracting workshops for particular processes (such as in labour intensive sewing tasks) and component manufacture. Many of the small workshops effectively providing cheap and informal labour pools.

Large firms tended to have regular ties with their subcontractors. Detailed specifications were provided by the large firms and emphasis was placed not only on the subcontractor's quality of service, but also their "delivery dates and rapid return period". The latter reduced batch sizes and ensured that costs of maintaining inventories (by large firms) was minimised (Ruas et. al. 1994:12). For most large firms "their relationship with the workshops [was] 'cooperative', especially regarding joint problem-solving in a quick manner" (ibid.: 12). Some large and medium sized firms in the Ruas et. al. study reported helping their subcontractors in production organisation or lending or repairing machinery and other equipment. Such assistance was "usually rendered to traditional suppliers and in periods of high demand" (ibid.:12). Similar forms of co-operation were observed between small shoe producers and subcontractors with the former frequently lending machinery and equipment (Peasgood & Schmitz 1994:15).

Moreover, quality needs of certain product market niches has meant that "some manufacturers are beginning to change their relationships with their subcontractors from casual to more regular ones. [The manufacturers] provide training to their subcontractors, give advance notice if orders decline and seek to achieve reliable quality from their subcontractors by investing in the relationship with them" (Schmitz 1995a: 17). However, while there are signs of technical collaboration between producers and their input suppliers and subcontractors aimed at upgrading product quality and process efficiency, "there is still a long way to go for this practice to become more common" (ibid.: 18).

Survey evidence suggests that the primary motivation for subcontracting on the part of large and small shoe producers is to lower wage costs, avoid social security payments and offset demand fluctuations (Ruas et. al. 1994, Peasgood & Schmitz 1994). Nevertheless, close to 40% of the small firm respondents did feel "that using subcontractors brought efficiency gains" (Peasgood and Schmitz 1994:12). In fact in the relatively more skill-intensive tasks where subcontracting was common (such as pattern grading), there were signs of close 'learning oriented' and collaborative relationships between producers and stage units.

Furthermore, in situations of contractual conflict between producers and suppliers, the norm was not to break the relationship but for producers to attempt to resolve production problems by offering supervisory assistance to subcontractors and adopting "a sense of willingness to

work through problems” (Peasgood and Schmitz 1994: 15). Similarly, the presence of large numbers of input suppliers led to a technical dialogue and an exchange of information which facilitated the timely provision of inputs according “to the precise requirements necessary for production”. While the presence of local suppliers and subcontractors helped to overcome capital and skill constraints for all shoe firms, backward linkages were, nevertheless, qualitatively stronger and better developed for larger firms.

### **Forward Ties**

Buyers, particularly those representing international retailers, have an important role in the Sinos Valley shoe cluster. They have acquired substantial technical expertise in the shoe industry. This has allowed them to go beyond being simple marketing intermediaries to becoming a source for technical know-how in the cluster. Among the tasks that buyers, particularly export agents, undertook were: “they studied the market which necessitated visiting shoe shops in the United States and Europe as well as international shoe fairs. They developed models which required setting up model shops in the Valley to produce samples. They inspected product quality and production schedules on site; they provided technical assistance; [and] they organised the transport and payment arrangements” (Schmitz 1995a: 14).

While buyers as a group are important, links between producers and buyers are often ambiguous if not temporal. For example, export agents were often resented by producers in the cluster on the grounds “that profits in trading are easy and highly exaggerated . . . [and] that in awarding contracts agents do not always reward quality and punctuality in previous contracts and care little about continuity. Price is all that matters” (ibid. 14). There are signs that this is changing. With the recent restructuring of the industry, buyers are moving to “smaller orders, shorter delivery times and higher quality”. Consequently, not only have small firms been able to raise their share of exports, but also ties with buyers in both local and international markets have begun to acquire greater depth.

To what extent have backward ties between producers and input suppliers and subcontractors as well as forward links with buyers, led to tangible signs of technical upgrading in products, skills and technologies? The evidence is far from positive. According to Schmitz’s sample of small firms, improvements in technologies over the previous five years was found to be “minimal”. Less than 1 in 4 firms reported working to a sample reject rate, while only 6% were aware of the ISO 9000 international quality control standards. A closer inspection of these findings suggests, however, that technological improvements, particularly in the form of incremental developments in production organisation, has been important to the cluster.

<b>Some Improvements in:</b>	<b>Proportion of Sampled Firms Reporting</b>
Technologies	57%
Product Quality	63%
Changes in Production Organisation	92%

Source: Peasgood & Schmitz 1994

Intra-firm, as opposed to inter-firm, production reorganisation led to a shift away from the former Fordist/Taylorist systems of production organisation to more modular “U-shaped” production cells. Most large firms had reduced inventory costs (cited by 94% of large firms) and were manufacturing smaller batch sizes with more frequent delivery schedules. There were also moves towards single product flows and a greater emphasis on monitoring and delegating quality control at each stage of production. These changes in production organisation and control were in keeping with the pressures towards downsizing and adopting flexible production systems. It was also in this area that interaction with local suppliers, subcontractors, and often buyers, as well as greater training of skilled workers and foremen, was most critical. Thus, as part of the restructuring process, 89% of large firms sampled by Ruas et. al. “had initiated employee involvement programmes...[and] 83% were developing new benefits schemes” for their workforce (Ruas et. al. 1994:15).

#### **1.4: Intervention by Support Institutions and Government**

Despite fierce local competition, which limits formal co-operation among producers, there is some lending of machinery among producers as well as informal co-operation in the sharing of information. There is little evidence, however, of shoe producers actively and systematically collaborating with other producers through joint purchases of inputs or the active sharing of resources. More important, though, is horizontal co-operation through sectoral associations and cluster-wide institutions in the Valley. As shown in the cluster map above, the Sinos Valley has a number of key support institutions geared to SMEs and the shoe industry, many of which were set up as a consequence of “collective campaigning and pressure from local producers” (Schmitz 1995a:19).

Among the more prominent institutions present in the cluster are:

- FENAC, set up in 1963 in conjunction with local producers and Novo Hamburgo’s municipal authorities to organise shoe fairs;

- SENAI's (National Industrial Training Service) vocational schools in tanning (1965) and in shoe design and manufacturing (1968);
- CTCCA, the privately set up leather and shoe technology centre, run by local shoe producers and other allied firms and opened in 1972;
- SEBRAE, the national small business service centre;
- the local Business Association (ACI), and the various sectoral and sub-sectoral trade bodies.

These institutions which are geared to the sector's development represent "a local developmental coalition" of public and private sector interests. They were particularly influential in facilitating the cluster's entry into export markets. For example, "FENAC [in conjunction with ACI] played a major role in the late 1960s/early 1970s in bringing foreign buyers to the Sinos Valley and taking local manufacturers to fairs abroad" (Schmitz 1995a:19). For both large and small firms the most significant sources of information on product and process innovations were local exhibitions and fairs, as cited by over 70% of sampled firms, underlining the continuing importance of FENAC to the cluster.

More recently the CTCCA has emerged as an important sectoral body. A private sector initiative, it has among its 192 member firms significant numbers of producers, export agents, machinery suppliers, component suppliers and tanners. With the fragmentation of the shoe industry association into sub-sector trade bodies during the export boom period, each with their own separate and conflicting sets of interests, institutional co-operation at the filiere or industrial branch level declined. CTCCA, by bringing agents from shoe industry related sub-sectors, such as tanners, producers and export agents, together on one platform, allows for the possibility of institutionalised technical co-operation through vertical ties across the commodity chain.

It is apparent, however, that support institutions, such as SENAI's vocational schools and the CTCCA, have benefited medium and large firms far more than small enterprises. Less than one quarter of the small firms sampled by Schmitz had contacts with the SENAI schools, the CTCCA or SEBRAE. In fact only 35% of small firms were members of the trade association. In contrast, almost all large and medium sized firms sampled by Ruas et. al had contacts with SENAI and CTCCA. While small firms which were not association members did benefit (through externalities) from the public services and political lobbying undertaken by the associations (Peasgood & Schmitz 1994), it was clear that the outreach of local technical support institutions towards smaller firms was limited.

## **1.5: Conclusion**

The Sinos Valley is an example of an industrial cluster from the South which has grown rapidly in a short space of time. It is now a recognised global player in the shoe industry with exports of close to \$1 billion a year. Although there are many large shoe manufacturing firms in the Valley, SME producers and exporters remain a significant element of the cluster. The cluster is also particularly remarkable for the local presence of numerous suppliers and input and component manufacturers. The range and depth of such agents generated externalities for local shoe makers, large and small. Moreover, all but a few of the very large firms in the cluster drew on local specialist subcontractors for specific tasks while large numbers of female home workers kept costs in much of the labour-intensive processes at a minimum. Cheap labour, however, is no longer the sole basis of the cluster's international competitiveness. In fact in the face of competition from cheaper Chinese labour, Brazilian shoe producers have sought to raise quality and penetrate higher value added export markets.

How has the cluster gained its current position? Government policy does not appear to have been the most critical factor. The cluster did benefit from the import substitution policies that prevailed through to the late 1960s and the subsequent export incentive programmes. However, the breakthrough in exports was achieved by the intervention of local institutions, FENAC in particular, and foreign export agents. The cluster is currently within another critical stage of development - a phase where it is required to not only raise its overall product quality but also reorganise production to meet shorter delivery times, smaller batches and more efficient, as well as quality-conscious, production standards. Evidence cited by Schmitz and Ruas et. al. indicates that such a process of reorganisation and upgrading has begun in large and small firms in the cluster. Being part of a cluster also helped this process of change.

While government intervention, through the "Quality and Productivity Programme" will no doubt have an impact, it is local actors, institutions and market agents that will be more critical in bringing about the successful switch in gear to ensure the cluster's international competitiveness. This is where inter-firm collaboration, especially through technical exchanges in both backward and forward linkages will gain in importance. Such collaboration was limited during the cluster's mass production export boom phase. It will be necessary, however, for both large firms and SMEs in the current demand-led, quality-sensitive stage of the new competition. While large firms and export agents remain key players in defining the strategy of change, both public and private sector institutions have a significant function in the cluster's ability to innovate and remain competitive.

## CASE STUDY 2: THE MEXICAN SHOE CLUSTERS OF LEON & GUADALAJARA

### 2.1: Introduction

The Mexican shoe industry provides an interesting contrast to the Brazilian Sinos Valley shoe cluster. As in Brazil shoe making in Mexico is locationally concentrated. There are three specialised clusters each producing distinct types of shoes. These are: Leon, with 51% of all Mexican shoe firms, manufacturing mainly men's and children's shoes; Guadalajara with 22% and producing largely women's shoes; and, Mexico City, with 12% of registered shoe producers, specialised in synthetic and textiles shoes (Rabellotti 1995b: 122). Mexican shoe firms are predominantly small, family run, enterprises with a strong artisan tradition. Larger firms, however, account for the bulk of value added in the Mexican clusters. In contrast to Brazil, the Mexican shoe industry is largely inward oriented, operating under protected market conditions and catering primarily to domestic demand. Exports of shoes from Mexico in 1991 accounted for only 7% of total production.<sup>3</sup>

Trade prospects for the Mexican shoe sector are changing. The industry has for some years now been in the midst of a process of transformation brought about by developments in its product market. First, the import liberalisation strategies adopted in 1988, as part of the structural adjustment package, led to reductions in import tariffs from 35% to 17% and the scrapping of import licences. As a result "the market [for shoes] was flooded with imports which increased from 2.2 millions of pairs in 1987 to 38.2 in 1991" (Rabellotti 1993:27). Second, the recent NAFTA trade accords, which provide access to the vast markets in the United States and Canada, flag the possibility of substantial growth for the Mexican shoe industry through export sales north of the border. This means going beyond the traditional exports, of cowboy boots and athletics shoes, to higher, quality fashion sensitive products that can compete in the quality conscious US market (in which Mexico's share is currently only 2%).

As a consequence of liberalisation the Mexican shoe industry is faced with market pressures at the low quality end from cheap East Asian imports, and opportunities at the higher quality end from the prospects of rising export sales to the US and Canada. How the industry shapes up in this unfolding competitive scenario is a matter of great interest. This case study draws from Rabellotti's work on the shoe clusters of Leon and Guadalajara (Rabellotti 1993, 1995a 1995b). It tries to posit the Mexican experience in contrast to the Brazilian story discussed

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<sup>3</sup> Of these exports, 60% were cowboy boots and athletic shoes (the latter made in US owned 'maquiladoras' operating close to the US border). Firms producing both these types of shoes were outside of the mainstream of the Mexican shoe industry, accounting for only 5% of total Mexican shoe sector employment.

earlier. The purpose of this is that the Mexican shoe sector, despite the advantage of being closer to the US market and operating in sectorally specialised clusters, has not been as competitive as that of Brazil. This raises some obvious questions: why has the Mexican shoe sector lagged behind? Why has the potential offered by clustering, through inter-firm ties which add to firm level efficiency and enhance prospects for technical progress, not been fully exploited in the Mexican shoe clusters? The trade reforms of the late 1980s, which altered the product market for Mexican shoe producers, and the subsequent NAFTA accords together constitute a defining moment for the Mexican shoe industry. Can the shoe clusters of Leon and Guadalajara use this moment to “switch gears” and develop forms of production organisation and inter-firm relations that enhance their prospects for competitiveness and technical progress?

The discussion begins by outlining the core features of the two Mexican shoe clusters. It details in particular the nature of backward and forward inter-firm ties currently present between shoe producers and suppliers, buyers and other ancillary agents. It also probes how these ties have changed with the recent market developments. The discussion then moves to the role of local institutions and technical support bodies. As in Brazil, local organisations and trade associations, as opposed to government intervention, appear to have played a key role in the clusters’ development. These institutions are likely to be of critical importance if the Mexican shoe industry is to make the switch in gear necessary to enter the “new competition”. The concluding section questions the prospects for SMEs in the Mexican shoe clusters to achieve sustained growth and competitiveness in domestic and international markets.

## **2.2: Inter-firm Relations in the Leon and Guadalajara Shoe Clusters**

There are an estimated 2,700 shoe firms employing 70,000 persons in Leon and a further 1,100 shoe producers with a total workforce of 25,000 in Guadalajara (Rabellotti 1995b). In both locations small firms dominate in numbers. In Leon 45% of shoe producers employ less than 15 persons while 88% employ less than 100 workers. Similarly, in Guadalajara 56% of shoe firms are very small (with less than 15 employees) and 93% are small (with under 100 workers).

Although small firms dominate in numbers, large firms (which employ over 250 persons) account for a substantial proportion of production, employment and value added. In Leon large firms account for 25% of the local shoe sector’s employment and value added; while in

Guadalajara large shoe producers account for a phenomenal 74% of value added in the local shoe sector.<sup>4</sup>

In both cities shoe making has a long local tradition. In Guadalajara there were 34 shoe plants and 100 small shoe workshops in 1927, while in Leon shoe making was a leading industrial activity, second only to textiles, as early as 1900 (Rabellotti 1995b). Today, footwear and the ancillary leather industry, are the leading industrial activities in Leon, accounting for 40% of total industrial employment in the city and 68% of Leon's GDP; and one of the three main industries in the much bigger city of Guadalajara.

Despite their scale and their long history in shoe making, both clusters fare poorly in terms of backward linkages with a technically well developed supply industry producing components, and machinery used in shoe making. Moreover, the presence of backward suppliers, such as tanneries and component producers, is quite uneven between the two clusters. Leon is much better endowed. Most tanneries in Mexico (95% according to Rabellotti), for example, are located in Leon and these number over 700 units. Similarly, "the majority of component and accessory producers are located in Leon. In Guadalajara, apart from a few important sole and heel manufacturers, there are mainly retailers or sometimes plants of Leon's [component] producers" (Rabellotti 1995b:137). Guadalajara-based firms often have to purchase certain key components (lasts for example) in Leon.

In certain backward linkages neither cluster is well served. According to Rabellotti, half the firms in both Leon and Guadalajara buy accessories from elsewhere in Mexico or from abroad. Moreover, unlike the Sinos Valley, neither Guadalajara nor Leon has a significant concentration of machine tools manufacturers. In fact 80% of the machinery used in the Mexican shoe sector is imported, largely from Italy (which accounts for 80% of imported shoe machinery in Mexico).

As in Sinos Valley, however, both Leon and Guadalajara have a number of active institutions which provide technical, financial and managerial support services. These include credit unions and technology centres providing specialist support services. The local trade associations (the 'Camara de l Calzado') have been particularly influential in providing institutional support to the industry. Targeted support by the State has, however, been limited.

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<sup>4</sup> Guadalajara has one very large shoe firm Calzado Canada, which employs over 10,000 persons and thus alters the size distribution significantly.

## **Backward Ties**

The “low availability of components and services” is cited as a key locational disadvantage by 31% of the 51 shoe producers sampled in both cities by Rabellotti (Rabellotti 1993:36). Furthermore, “only about 30% of suppliers [were said to] produce a competitive product in terms of quality, fashion, design and service” (Rabellotti 1995b: 137). While shoe producers in both clusters “complained about the low quality of components and raw materials and the scarce attention to fashion changes and bad services provided by their input suppliers”, suppliers blamed shoe producers for “adopting a strategy focused more on price than quality...[and for] unstable demand and payment delays” (Rabellotti 1995b:138).

The absence of substantial and in-depth backward supplier linkages proved disadvantageous to the Mexican shoe clusters. In part this was an outcome of the protected domestic market in which both clusters operated until the latter half of the 1980s. Quality and design were not considered as important aspects of inter-firm competition and the paucity of close ties with backward suppliers, essential for quality and cost efficiency, was not seen as a serious impediment to industrial growth. In the seller’s market of the domestic shoe industry, growth was directly correlated to rising domestic incomes. Competition focused on price, with little effort by local producers to innovate or adopt new fashion ideas.

As demand pressures in the domestic market changed with the advent of trade liberalisation, there have been some positive effects on backward ties that shoe producers have with their suppliers of inputs and components. There are signs that producers, and sometimes wholesalers as well as other marketing agents, are attempting to forge more stable arrangements with suppliers. There is also evidence of joint collaboration between producers and component manufacturers on developing new designs and improving on quality. Rabellotti (1995b: 138), for example, cites one of her case study producer firms as spending time with a supplier to “work on a new sole together”. In addition attitudes to suppliers are beginning to shift on the part of shoe manufacturers with attempts being made by the latter to collaborate with the former in order to resolve problems. Component suppliers, for their part, have also begun to develop and adapt products to suit the specific needs of their shoe producing client firms. Such improvements in backward linkages, brought about by the new competitive pressures in local and foreign shoe markets, enhance prospects of technical progress in the Mexican shoe sector as a whole. As yet, though, collaborative practices are not widespread and there is little evidence of indigenous technical progress.

Along with underdeveloped supplier linkages, the Mexican shoe clusters are marked by a tendency to verticalise and integrate production. Production subcontracting is not common. Half the firms sampled in the Rabellotti study did not externalise any aspect of production.

According to another study “95 per cent of leather soles for children’s shoes, 90 per cent for men’s and 65 per cent for women’s are produced inside the shoe enterprises [whereas] in Italy 80 per cent of leather components are produced in specialised, independent firms” (Boston Consulting Group study cited in Rabellotti 1993:31). Similarly, Rabellotti’s data indicated that there were no activities where shoe firms relied exclusively on external contractors. Baud (1992), however, has argued that rising labour costs and the scarcity of skilled labour has in recent years forced shoe producers to seek low waged, often rural based, subcontractors. This is most pronounced in labour intensive activities (such as sewing) which are increasingly carried out by home based, lower waged, and more productive women workers.

In Rabellotti’s study most firms, even very small ones, prided themselves on their ability to carry out all production related activities. This had serious consequences, such as a low level of specialisation within the local shoe sector; long processing time (twice the global average according to Rabellotti); and, an inability on the part of many SMEs in both clusters to take on large orders. Thus a number of firms sampled by Rabellotti reported that they had been unable to take on export orders from US buyers purely because the volume required was beyond their capacity.

Rabellotti puts forward two reasons for the comparative lack of deverticalisation of production. The first relates to the low standards of suppliers especially “with regard to quality, design, fashion of components and service”; and, second, the absence “of standard technical language and of a common, universally accepted, measurement system” that would allow for a technical dialogue between shoe producers and component suppliers.

### **Forward Ties**

Marketing and commercialisation is also weak in the Mexican shoe clusters -- again for reasons similar to those cited for poor backward linkages. A protected domestic market stunted the development of collaborative or quality enhancing forward ties. Links with buyers revolved around price competition, cited by 63% of firms interviewed by Rabellotti as the primary basis of competition, with little attempt on the part of the buyers to co-operate with producers in developing new products.

Most firms sampled by Rabellotti in both clusters produced for the domestic market; although one third also did export (however only a quarter of these units sold over 40% of their total production abroad). The key marketing channels were independent retailers (accounting for 40% of domestic sales), shoe chains, supermarkets and wholesalers. In all cases, including the marketing of export goods, producers had little knowledge of the end

market. This left them seriously disadvantaged with respect to access to market information, particularly relating to design, fashion trends and quality feedback.

Again, as with backward ties, the recent developments in the domestic and export markets for shoes has led to some qualitative improvements in forward ties. The key agents that have initiated this were some domestic wholesalers and the few foreign buyers. A few wholesalers employed technical personnel to visit producers in order to check production quality at site and provide technical and organisation advice. Foreign buyers also often extended technical and financial assistance; although such ties had yet to stabilise into regular contracts. Wholesalers operating in the domestic market had been known to pool input purchases in order to ensure standardised quality levels and thus offset the vagaries in backward ties. Shoe producers who sold through such marketing channels found that, despite an element of dependency on such marketing agents, they benefited from the technical advisory services that buyers offered.

### **2.3 : The Role of Institutions**

“At the national level there are no specific policies addressing the footwear sector” (Rabellotti 1995b: 154). However, as in the Sinos Valley, both Mexican shoe clusters have a significant presence of local support institutions. These have tried to promote inter-firm collaboration within the clusters, improving ties with backward suppliers, and facilitating the development of local financial, technical and producer service facilities. Particularly important among these local institutions has been the shoe making entrepreneur’s association: the ‘Camara del Calzado’.

The Camaras are to be found in both clusters.<sup>5</sup> The Camaras organise regular trade fairs, and supply various types of producer services to their members. These include: fiscal, legal and labour advice as well as managerial training and lobbying of government on behalf of the sector. In addition the association provides specialised technical advisory services including bringing in local and foreign (often Brazilian) technical consultants to provide strategic advice to members on issues of quality, production control and management and design.

The Camaras’ activities are financed by membership dues and by the profits earned from the regularly held trade fairs (which were often the leading sources for information within the clusters). Leon’s Camara del Calzado had approximately 800 members while Guadalajara’s

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<sup>5</sup> There is also a Camara del Calzado for the Mexico City area as well as the Central Camara which supports, and at times co-ordinates, the three regional associations. For day to day operations, and in terms of broad support strategies, each of the regional Camaras operate independently.

Camara had 500. The former was dominated by larger firms whereas the latter had more active participation by SMEs. Possibly for this reason the Guadalajara Camara, in spite of the fact that its shoe industry was smaller in scale to that of Leon's, was more active in encouraging collaborative initiatives on the part of local producers.

Among the initiatives taken by the Camara del Calzado of Guadalajara, was the proposed development (in a joint venture with foreign firms) of an industrial park for shoe producers as well as component manufacturers. The Camara had also made contacts with firms in the Italian shoe district of Brenta to form joint ventures and encourage technical collaboration with local producers in Guadalajara.

Another initiative undertaken by the Guadalajara Camara (using a UNIDO methodology) was to encourage inter-firm collaboration through what were called "agrupamentos industriales". The agrupamentos brought firms together as loose members of group. Within these groups member firms had to agree to organising factory visits for other group members. This broke down much of the distrust common among local competitors. Moreover, group members also had to accept an independent diagnostic audit of their plants conducted by external experts. Through these initial processes, aimed at facilitating inter-firm dialogue and raising technical and market related awareness, a regular process of knowledge exchange and discussion of common problems and technical issues began to take place among group members. In a period of seven years, seven such groups had formed in Guadalajara with 120 firms involved in these dialogues.

Similar types of joint industrial groups had also formed, usually around extended families or on the basis of long standing friendships, to make collective input purchases, market collectively, or undertake complementary production tasks in shoe production. A Ministry of Industries programme also encouraged horizontal collaboration through what were called "empresas integradoras". These were companies set up by shoe producers for buying inputs or selling output jointly, or for some form of horizontal collaboration. Rabellotti cites three "empresas integradoras" operating in Leon. These included a group of very small firms who were marketing their products using a joint brand name and were collectively participating in trade fairs. There was also evidence of horizontal collaboration through formal equity agreements as well as informal sharing of equipment, and some cases of capacity contracting amongst local producers.

Both the Leon and Guadalajara Camaras had initiated discussions to enhance backward supplier linkages. Technical meetings were held by the local Camaras with their respective component suppliers associations (ANPIC in Leon and APICEJ in Guadalajara) "to discuss

and jointly elaborate fashion trends... [and] to work on the standardisation of the measurement system. The lack of a standard, commonly accepted measurement system is a major obstacle for the development of an efficient system of specialised [supplier] firms” (Rabellotti 1995b: 139).

Local shoe producers’ credit unions (CUs) had also emerged in both clusters to facilitate easier and cheaper access to loans from the banking sector, especially for SMEs; and to encourage collective purchasing of inputs by CU members. Again the Guadalajara credit union had a larger membership, and had grown more rapidly, than Leon’s credit union. Leon’s shoe producers’ credit union, with only 46 members, had no ties to the local Camara; whereas Guadalajara’s credit union, which was tied to the local Camara, had 235 members in 1993 and a full time staff of seven. Of the Guadalajara CU’s membership 60% were very small firms (with less than 15 workers). Membership was based on the purchase of at least one share (valued at US\$ 150 each) of the union. To ensure that no firm managed to acquire a dominant control over the CU, the number of shares that could be acquired were limited to 500 per member. The volume of shares controlled access to credit as well as acting as a form of collateral. The CUs largely financed the working capital needs of their SME members (80% of credit being allocated by the CUs was for working capital). In effect, they reduced the transaction costs that SMEs faced in the market for credit.

In Guadalajara the Camara had also supported the setting up of a local technical institute for shoe making (Instituto Tecnológico Calzado, ITC). The ITC, set up in 1984 with grant aid from the World Bank, provided training for entrepreneurs and supervisors; arranged technical seminars on issues of concern to local producers (ranging from quality control, production planning and managerial innovation); and undertook technical research on behalf of the sector. The ITC also proposed to set up a testing laboratory, a technological data bank and a CAD-CAM design and manufacture station. A similar technical support body, operated by the government, also functioned in Leon. The Centre for research and technical assistance (CIATEG) provided quality control, specialised training and technical services for Leon based shoe producers.

## **2.4: Conclusion**

In spite of the fact that both the Mexican shoe clusters of Leon and Guadalajara have a larger number of shoe producers than found in Brazil’s Sinos Valley and that both have a history in the shoe making industry that dates back well over seventy years, neither cluster displays the dynamism observed in the Sinos Valley shoe cluster. Backward ties between producers and their component suppliers and process subcontractors, and forward linkages with buyers, are

weak. As Rabellotti notes not only is technical co-operation limited in both the Mexican clusters, but also clustering, per se, is insufficient to bring out the types of production linkages that enhance collective efficiency.

However, Rabellotti's work shows that a number of externality gains do accrue to cluster based local producers. Furthermore, at the level of joint action, the initiatives taken by the collective institutions of both clusters, especially the Camara or trade association in Guadalajara, have had a positive impact: facilitating access to capital, providing producer services, and accelerating the flow of technical and marketing knowledge through regular trade fairs, as well as technical and managerial advisory services.

The Mexican case study emphasises again that markets influence production ties: be they backward, forward and/or horizontal. The relative absence of dynamism in the Mexican shoe clusters appears to be closely related to the protected domestic market environment in which pressures to compete and innovate were absent.

As Rabellotti argues, the "long closure of the domestic market has not favoured the development of efficient backward related industries in Mexico" (Rabellotti 1995b: 174). Backward linkages, that reflect an intensity and depth of technical interaction between producers and suppliers that improves collective learning and leads to higher levels of efficiency and a sustained supply of high quality inputs on demand, are particularly critical to any cluster's long term success. One of the strengths of Sinos Valley has been the local presence of well developed producers of components, leather and necessary machine tools. In the Mexican clusters shoe firms do have access to most, if not all, inputs locally. Yet these inputs are of low quality, ties with suppliers are poor and unstable and price determined; and, furthermore, there is no capital goods sector providing cheap productivity raising machine tools.

A number of studies, including Schmitz (1995a) on the Sinos Valley as well as Knorringa (1995) on the Agra shoe cluster, have emphasised the importance of buyers and marketing agents to an SME cluster's long term development. In the Mexican experience, despite some obvious advantages, forward ties with buyers, both local and foreign, also remain weak. This is one of the main reasons why Mexico did not enhance its overall competitiveness in global markets.

The opening up both the Mexican and the US consumer markets, as a consequence of the post-1988 trade liberalisation strategies, is beginning to alter inter-firm ties. Under pressures to compete in both local and foreign markets, there are signs of process, if not product,

innovation. For example, Rabellotti observed the first steps towards a single product flow system being followed by some of the more innovative shoe producers. This was the adoption of the “pair-by-pair” production methodology where the production process was geared to each pair of shoes being taken through the whole process, rather than being a part of linear production line. This approach has been seen in Brazil to bring about reductions in inventory costs, raise labour flexibility and reduce dead time (Prochnik 1992). In addition, these competitive market pressures have led to signs of inter-firm co-operation especially with component producers.

The Mexican experience also indicates, in line with what is observed in the Brazilian case study, that local institutions, especially representative trade bodies, can play a key role in encouraging local producers to make the necessary switch in gear and in providing collective technical and information services which serve to enhance local cluster competitiveness. However, for such support services to bear more fruit, the individual enterprises and collective institutions need to become more customer oriented and strengthen their ties with local and foreign buyers.

It may well be too early to judge what trajectories the Leon and Guadalajara clusters will take in the unfolding competitive environment. As the overview suggests, the degree of dynamism across both clusters is far from uniform. Furthermore, as Rabellotti has warned, neither cluster is in itself homogenous. Size differentiation in particular is quite likely to influence the different types of growth experiences within the clusters. Despite these caveats, it would appear that SMEs in the shoe sector that do not operate within cluster environments in Mexico will not fare as well as those that are part of sectorally specialised clusters. The latter have access to both economies of agglomeration as well as to the externalities of joint, particularly institutional, action. Clearly, the question remains as to whether the two Mexican shoe clusters will be able to get into a position fast enough to exploit the new opportunities and grow in a sustainable and competitive fashion.

## CASE STUDY 3: THE KNITWEAR CLUSTER OF TIRUPPUR. INDIA

### 3.1: Introduction

India's textiles sector is known for being spatially and sub-sectorally concentrated. Synthetic garments, for example, are produced largely in Delhi and Bombay's large mill sector, whereas the woollen knitwear industry is almost wholly based in Ludhiana in Punjab (Cawthorne 1990). In the cotton knitwear sector, which has tended to be dominated by small firms<sup>6</sup>, spatial agglomeration is also pronounced. The main centres are Tiruppur, a small town (estimated population of 235,000) in the Southern state of Tamil Nadu, and the metropolis of Calcutta.

The cotton knitwear sector in India has also experienced a remarkable record of export growth in the course of the 1980s and early 1990s as global demand for cotton clothing rose. Tiruppur (whose very name is associated with the Tamil word for spinning), despite its small size and relative obscurity, has emerged as India's leading cotton knitwear export centre, manufacturing garments sold by recognised high street retailers in Europe. According to one recent estimate, Tiruppur's direct knitwear exports were in 1993 worth nearly US\$ 500 million, whereas if indirect exports are also included (taking note of exports of Tiruppur made garments sold through Bombay and Delhi based traders and producers), this figure jumps to over US\$900 million (Swaminathan & Jeyaranjan 1994).<sup>7</sup>

Tiruppur has been described as a "boom town" (Cawthorne 1990), whose growth is tied to the cotton textiles industry. While Tiruppur's producers clearly benefit from the availability of local cheap labour, the overall competitiveness of Tiruppur's knitwear sector is rooted in a localised tradition of cotton weaving and a production organisation system, based on spatial and sectoral clustering, which hinges on specialised and flexible inter-firm production arrangements. This has led, in recent years, to clear signs of product development and technical progress. (Swaminathan & Jeyaranjan 1994).

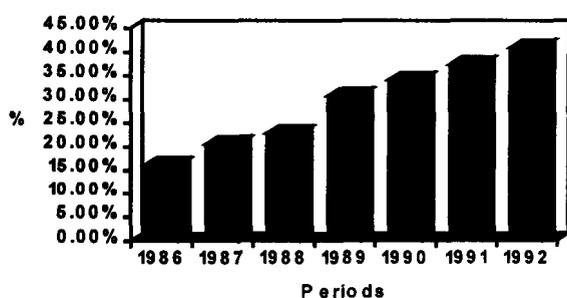
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<sup>6</sup> The cotton weaving industry, particularly handloom weaving and hosiery, has traditionally been 'reserved' in India's industrial development policy for small scale industries. Cawthorne (1990) attributes this to the Gandhian philosophy of self-reliant small producers. Through the reservation policy small producers have been able to avail both fiscal benefits in the form of tax relief, exemption from certain labour benefits provision and easier and cheaper access to credit. In recent years the industrial restructuring and liberalisation policy has led to a reduction in the number of sectors reserved for small scale industries and a more lax interpretation of size in order to encourage better endowed small firms to innovate and technically develop (See also Kashyap 1988, 1992 on the nature and development of SMEs in India).

<sup>7</sup> India Today (March 31, 1994) in a special report on Tiruppur suggested that exports in 1994 from the cluster were in the order of Rs. 20 billion (approximately US\$ 750 million).

Tiruppur is a textiles town par excellence. It lies in the heart of a cotton producing area. It has a long history as a processor of raw cotton, as a centre for handloom weaving and as a cotton trading centre. Its cotton exchange traditionally set the price of raw cotton in the state of Tamil Nadu (Cawthorne 1995). Moreover, “84% of factory industry in Tiruppur is textile related” (Cawthorne 1992:4). There are numerous small scale knitting and weaving firms as well as hundreds of garment producing firms. There are also many ginning and spinning mills that provide yam for the knitting units<sup>8</sup>; dyeing and bleaching units to colour cloth produced by the weaving and knitting sector, and screen printers that print cloth according to pre-arranged designs for garment makers. There are also component producers, manufacturing elastic, buttons, thread and labels, as well as producer service suppliers. Together these predominantly small scale firms have, as Chart 3.1 below shows, boosted Tiruppur’s share of all Indian cotton knitwear exports from 16.1% in 1986 to 40.9% in 1992.<sup>9</sup>

**Chart 3.1: Tiruppur’s share of all Indian cotton knitwear exports**



Tiruppur appears on the face of it a classic example of small town, small firm, success using the broad framework of an industrial cluster. This review, using primary material from various studies (Cawthorne 1990, 1992, 1995; Swaminathan & Jeyaranjan 1994), probes the nature of inter-firm ties in this internationally competitive and successful cluster of small producers. The following section details the core features of the Tiruppur cluster. Section 3 goes into the nature of inter-firm production ties within the cluster, in the form of backward and forward linkages, to assess how technical progress, product development and know-how has been achieved. Section 4 reviews the work of local institutions and policy interventions. The concluding section considers both the growth prospects of the Tiruppur cluster as well as

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<sup>8</sup> The ginning and spinning sector together employed a much larger workforce in Tiruppur than the town’s knitting units in 1986.

<sup>9</sup> According to the Tiruppur Exporters Association (TEA) by 1993 “Tiruppur’s exports [accounted for] nearly 85% of the total cotton knitwear exported from India” (cited in Swaminathan & Jeyaranjan 1994: 1). The basis for this figure though is unclear.

the lessons that emerge from Tiruppur for other sectorally specialised clusters operating in similar labour surplus environments.

### **3.2: An Overview of the Tiruppur Knitwear Cluster**

At the centre of the Tiruppur cluster are the cotton knitwear garment manufacturers. These consist of three types of “producers”: first, manufacturing exporters; second, merchant exporters; and third, non-exporting manufacturers. While each category has large, medium and small units within it, the first and second categories “dominate the scene [and] control (formally and informally) a variety of enterprises spanning both horizontally and vertically” related ties (Swaminathan & Jeyaranjan 1994:5). The third category, namely non-exporting manufacturers, undertake subcontracting tasks for firms in the first and second categories, and sell to the domestic market. These units tend to be somewhat smaller, and to produce simpler items (i.e. white men’s vests) which are easier to cut and stitch and do not need dyeing.

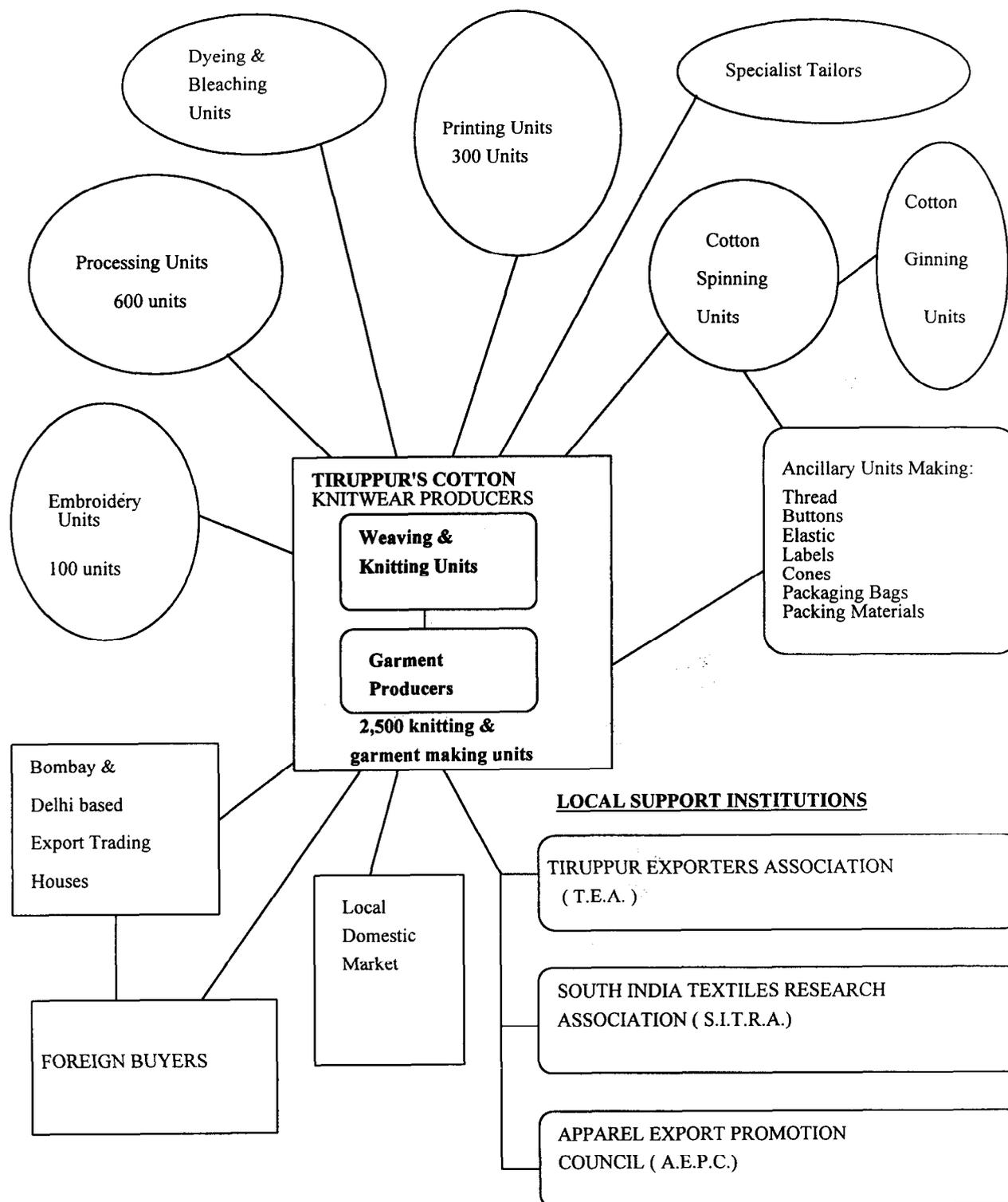
Estimating the actual number of garment producers in Tiruppur is problematic. Swaminathan & Jeyaranjan (1994) report some 2,500 knitwear and garment making units in 1993.<sup>10</sup> The vast majority of these were “small units”. However, the widespread practice of firms splitting into notionally separate units, yet remaining functionally part of the “larger” parent firm, a process that Cawthorne describes as “amoebic capitalism”, throws doubt on the reported data on both the actual numbers of “firms” in Tiruppur’s cotton knitwear industry, and their true size. As Cawthorne found from her primary research in 1986, there were “approximately 65 ‘large’ firms in the knitting industry. But each of these firms can be split into anywhere up to 10 (in a few cases more) units of production” (Cawthorne 1995:45).

The cluster map below provides an overview of the Tiruppur knitwear sector. In addition to the numerous garment manufacturing and cloth fabrication units, there were also an estimated 600 processing units, 300 printing units, and over 100 embroidery units in the cluster in 1993 (Swaminathan & Jeyaranjan 1994).

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<sup>10</sup> Swaminathan and Jeyaranjan’s figures come from the Tiruppur Exporters Association (TEA). Using secondary data, Cawthorne reported an estimated 1,500 small scale industries in Tiruppur’s knitting industry in 1986. Only 254 knitwear firms were, however, registered (and thus larger) units.

CLUSTER MAP OF THE TIRUPPUR COTTON KNITWEAR CLUSTER, INDIA



Source: Based on Cawthorne 1990 & Swaminathan & Jeyaranjan 1994

There are large numbers of other textiles related activities also present in Tiruppur, offering the knitwear sector both local backward and forward production linkages. These include firms undertaking: cotton ginning, yarn spinning, cloth dyeing and bleaching, calendering, specialist tailoring, and screen printing. There are also ancillary units providing buttons, elastic, spinning cones, clothing labels, packaging supplies, as well as undertaking various producer services (Cawthorne 1990). Finally, there are a number of key local institutions and representative trade associations providing sectoral support (Swaminathan & Jeyaranjan 1994). Almost all of these knitting, garment making and ancillary firms are, irrespective of their true size, family managed and locally rooted enterprises.

The textiles sector accounts for the bulk of manufacturing employment in Tiruppur.<sup>11</sup> Cawthorne found that in terms of wage payments, skilled workers in the Tiruppur cluster earned wage rates that were comparable with those of lower paid textiles mill workers in the regulated and formal sector. Furthermore, women and children, often working in rural villages, were an important segment of the labour force especially for the smaller units, This led Cawthorne to conclude that Tiruppur's success had a great deal to do with the easy availability of cheap labour (Cawthorne 1990).

But cheap labour is not a sufficient explanation for Tiruppur's global success. Tiruppur has a long history in the cotton knitwear sector and specialised sectoral knowledge and technical know-how on making and working cloth has coalesced locally over the years (Cawthorne 1990). The first knitting machine was brought to Tiruppur in 1925. Six years later there were reportedly five knitting firms in the town. In 1942 there were two registered knitwear firms. The number of knitwear firms in Tiruppur rose to over 100 in 1953 and to 438 units in 1961 (Cawthorne 1990). At this time Tiruppur was a single product sector manufacturing white cotton vests for men. In 1968 other items of underwear also began to be produced; and in 1974 the first export consignment was manufactured. Two decades later, exports from Tiruppur were reportedly in the range of US\$ 750 million. Chart 3.2, below, gives an indication of production growth in the cluster in recent years.

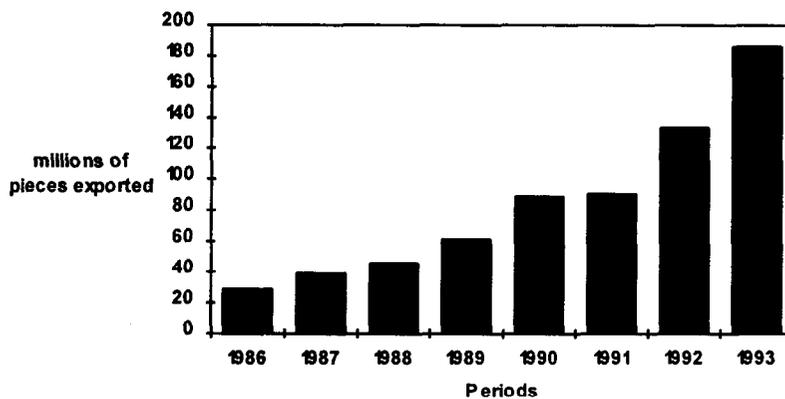
This recent history of dynamic production expansion and export growth can be broken into three periods. Prior to 1980 the Tiruppur cluster consisted largely of small, family-run, units producing cotton vests and briefs predominantly for the domestic market. From 1980

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<sup>11</sup> Swaminathan and Jeyaranjan (1994) suggest an estimated 100,000 persons being directly employed in the local knitwear sector, with an additional 150,000 workers in ancillary sectors. Again the quality of this data is doubtful, especially as Tiruppur's total population is under 250,000. According to Cawthorne's (1990) findings employment in the registered knitting firms of Tiruppur in 1986 was 9,970 and in the textiles sector as a whole under 30,000. These figures are also inaccurate in that they fail to take note of employment in unregistered units.

onwards local producers began to make T-shirts for exports. These exports were channelled through Bombay and Delhi based export trading houses that had established contacts with foreign buyers. Over these years a number of these trading houses began to establish local offices in Tiruppur to liaise directly with producers. Simultaneously, Tiruppur's manufacturers began to make independent contacts with foreign buyers, while some of the larger Western retailers who were sourcing from Tiruppur started discussing product details regarding design and quality with local producers, often through their Indian agents. Thus, by the mid-1980s direct exports from Tiruppur itself began to grow. In 1986 Tiruppur was directly exporting Rs 374 million of knitwear. At the same time Tiruppur also raised its share of the domestic market, manufacturing over 60% of the domestic production of white cotton vests in 1986 (cited in Cawthorne 1995:45). Moreover, as Cawthorne's research points out, within the domestic market, Tiruppur's knitwear and garment producers had progressed to manufacturing the higher quality cotton hosiery brand names in the Indian market for leading local trading houses.

**Chart 3.2: Volume of knitwear exports from Tiruppur, 1986- 1993**



Source: Based on Swaminathan & Jeyaranjan

By the late 1980s most of the local producers Cawthorne interviewed in Tiruppur felt that the “domestic market was close to saturation point” (Cawthorne 1995:47). It was clear that in order to sustain growth the sector had to turn more aggressively to export markets. Through the experience gained from quality production for the local market, and the ties built with both Indian marketing agents and foreign buyers, the ground was laid for an upsurge in exports. The volume of direct exports from Tiruppur accelerated in the late 1980s and early 1990s. In 1988 Tiruppur was exporting close to over Rs 1.0 billion, and by 1993 nearly Rs 20 billion. The product range also expanded with outerwear taking over from underwear. The

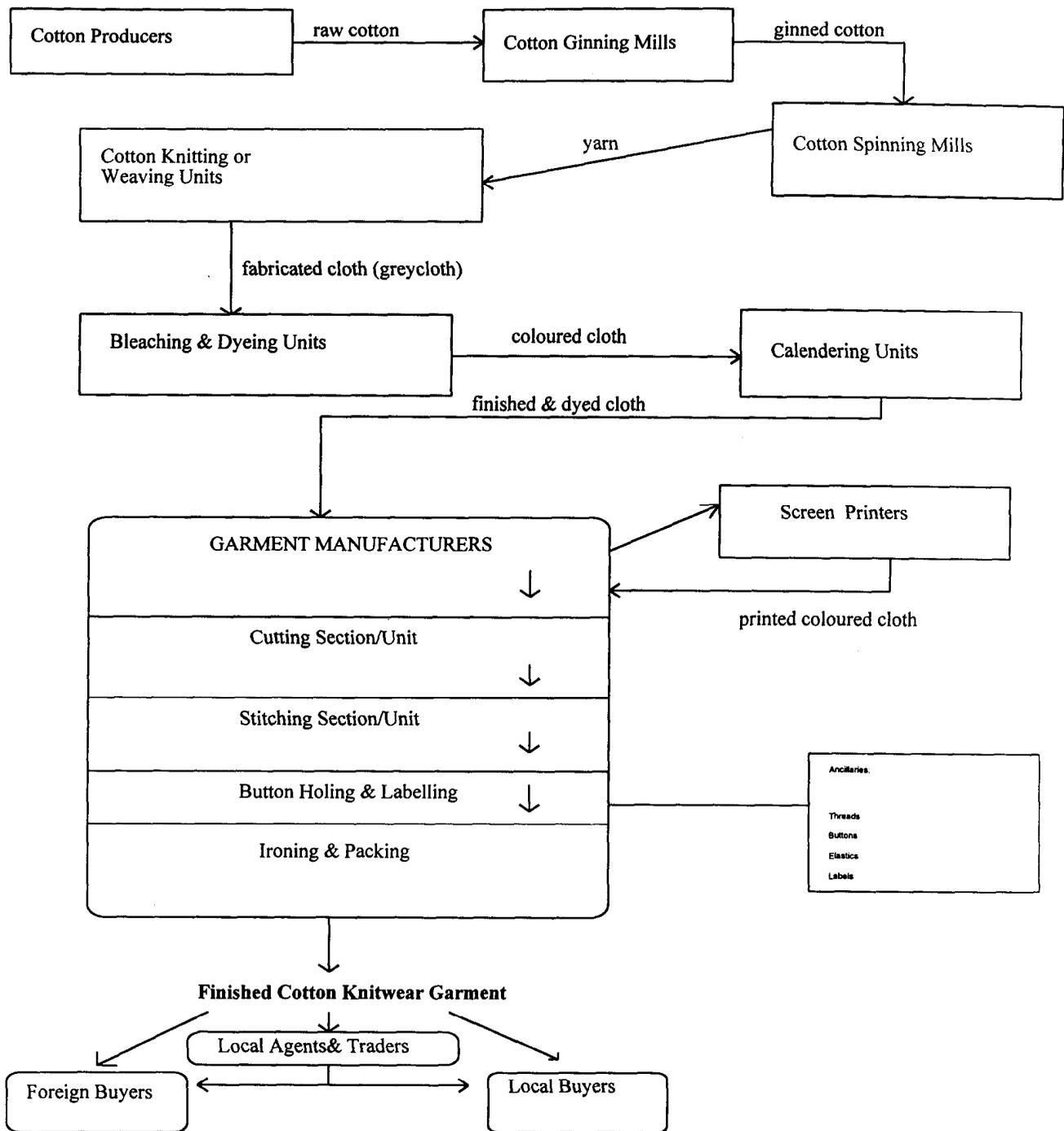
cluster, now a multi-product cotton knitwear producer, manufactured: T-shirts, vests, cardigans, jerseys, pullovers, ladies blouses, dresses, skirts, trousers, sportswear, and industrial wear. Furthermore, the cluster had forged direct trading ties with leading Western retail outlets (such as C & A, French Connection) and key foreign traders (Cawthorne 1990, Swaminathan & Jeyaranjan 1994).

With the Tiruppur cluster's rapid growth, three key features emerged. First, the structure of the cluster has altered. There has been extensive segmentation in the industry, in terms of the types and sizes of firms, the products they manufacture, the types of textiles they use and the markets that they target. Moreover, various forms of production relations and patterns of subcontracting have emerged as firms expanded by "splitting" into smaller, notionally independent, and technically functional units. While this brought legal advantages (by allowing access to fiscal and labour benefits of the small scale sector), it also raised production flexibility. Smaller orders of a more diverse range of clothing could be undertaken (Cawthorne 1990). Second, there is clear evidence of technological innovation and development, especially as the range of products expanded placing greater emphasis on design and on the dyeing and printing processes (Swaminathan & Jeyaranjan 1994). Third, a number of key local institutions (such as the Tiruppur Exporters Association TEA) and all-Indian support bodies (the Apparel Export Promotion Council AEPC), emerged to play an important function in supporting the cluster's sustained growth and international competitiveness. Some of these developments are addressed in the next section which probes the nature of inter-firm relations within the cluster.

### **3.3: Production Organisation and Technical Development in Tiruppur's Knitwear Cluster**

To get a sense of backward and forward inter-firm production linkages within the Tiruppur cluster it is helpful to first disentangle the separate, and easily separable, stages in production. This is done in the process flow map below.

**PRODUCTION/PROCESS FLOW MAP FOR COTTON GARMENT PRODUCTION IN TIRUPPER**



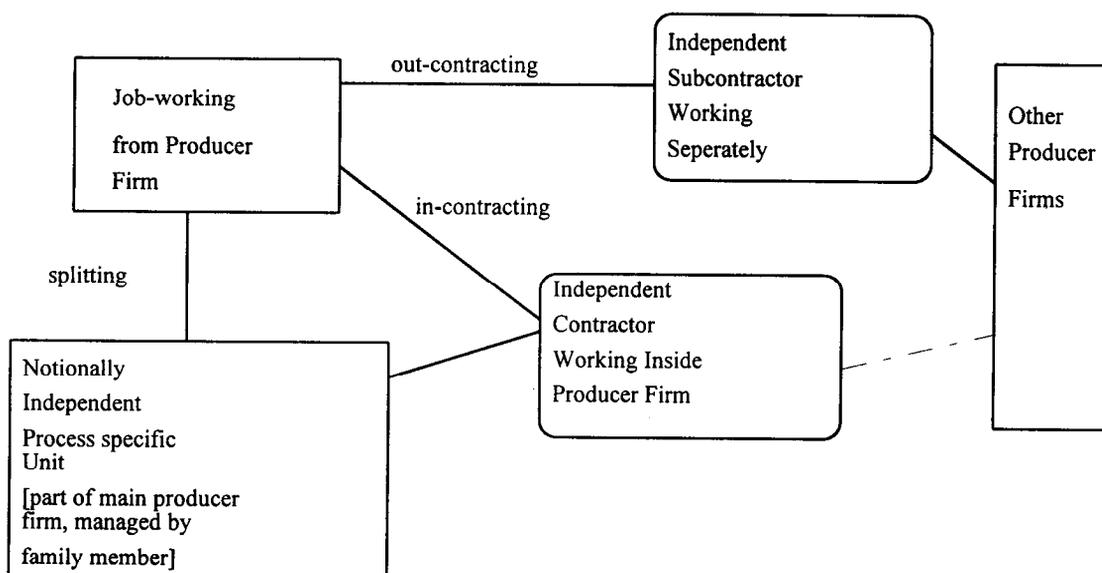
Source: Based on Cawthorne 1990

## Backward Ties

In terms of backward suppliers, raw cotton and spun yarn is easily available locally. As mentioned earlier Tiruppur lies in the heart of a cotton producing region. There are also many yarn making spinning units (37 in 1986). Local weaving and knitting units turn cotton into cloth. Dyers colour the cloth, while screen printers print the designs. The finished cloth is cut and stitched, finished, ironed and packed by the garment maker, the “main” product manufacturer (and often exporter). All ancillary components, such as thread, buttons, elastic, labels and so on are locally manufactured.

While most of the production processes, and components, are clearly distinguishable; there are various types and degrees of vertical integration observed in garment production in Tiruppur. Some of these more common production arrangements are represented below.

### PATTERNS OF INTER-FIRM TIES IN TIRUPPUR’S KNITWEAR SECTOR



Cawthorne describes Tiruppur’s production system as “amoebic capitalism”. By this she means that “firms in the knitwear industry have expanded their businesses through continual fission” (Cawthorne 1990:218). This process of splitting, amoeba-like, has been motivated in part by the desire (if not an actual requirement) to remain within the small scale industry sector and thus access various state provided tax and credit benefits, be outside the purview of labour legislation, and minimise labour costs through extensive process specialised job-working with a heavy reliance on cheaper (and often more productive) female labour. This approach has had some unexpected consequences. As mentioned earlier, through this system

of organisation, production flexibility has been enhanced. A number of producers report being able to take on small orders at short notice and across a diverse range of garments. It has also meant, as Cawthorne has argued, that the notion of size in this industry is rather vague. Through cross cutting patterns of equity ownership across “independent” units there is, in fact, a “concentration of capital resources without the centralisation of production processes” (Cawthorne 1990:218).

Job-working is the term used “to describe work (a job) between different firms specialising in different process, within firms between different units specialising in different processes or to refer to contract work organised through traders. ‘Out-contracting’ takes place between firms specialising in different processes... ‘in-contracting’ has developed within some of the larger firms where an owner employs a ‘job-work contractor’ for each unit. The contractor acts as a production manager who is also responsible for employing labour for a particular ‘job’” (Cawthorne 1995:47).

There are also many small independent firms that undertake subcontracting tasks for larger producers, either as “capacity contractors” or as process specialists or component manufacturers. Such firms also work for other garment producers. In tandem with the process of splitting up into notionally separate units, many firms also rely on contracting agents that undertake specific tasks inside the firm. In addition to being responsible for labour management and labour costs, “These contractors [are] held financially responsible for quality control... leased all necessary machines and supplied with raw materials for a particular job. Occasionally, [they can] do ‘job-work’ for other firms if there is idle capacity” (ibid. 49).

Among the more integrated of the larger exporting manufacturers the following tasks are undertaken in-house: garment making, cotton weaving and knitting (i.e., cloth fabrication), and often printing and/or dyeing functions as well. Usually, in cases where garment producing firms do integrate, however, it is by internalising the cloth fabrication process of cotton knitting and weaving. Where such vertical integration occurs it is usually through notionally independent units, managed by other family members, with extensive “in-contracting” arrangements with specific job-contractor who undertake labour management responsibilities. While this appears to be the norm in terms of patterns of production arrangements, Cawthorne (1995) did observe a few cases of firms aspiring to grow into fully vertically integrated and centrally managed large firms.

What technical and economic benefits do these various types of inter-firm production arrangements generate? In the case of in-contracting there are clear benefits to be had for the

large firms. This practice shifts risks and labour supervision costs onto the contractor. Furthermore, the allied process of splitting up into notionally independent concerns allows manufacturers to continue to avail the benefits that accrue to protected small scale industries by remaining legally within the small industry category.

While these are indicative of 'low-road', labour cost cutting motivations, there are further gains to be had from such arrangements. Such practices often allow a family group to mobilise and invest a larger volume of capital, and to manage a large operation more efficiently than an individual unit could have done. This can also enhance the overall flexibility of the firm through a pattern of devolved management. Thus, as Cawthorne notes, "various family members specialised in different parts of the production process, so that they could fabricate cloth, bleach and dye it and make up garments: a kind of hybrid situation in which the issues of quality and trust are not problematic" (Cawthorne 1995:47).

Out-contracting, the more common subcontracting arrangement observed elsewhere, also generated various types of gains. For large firms the easy availability of numerous process specialised smaller firms saved costs on space, machinery and labour. Long term arrangements tended to have been built between the various parties which improved production quality and allowed larger producers to keep close to the strict quality stipulations laid down by foreign buyers. For small and medium sized subcontracting firms, who were rarely dependent upon one single garment producer and often undertook work for others or sold independently in the local market, subcontracting for larger producers offered a learning opportunity. Such firms not only gained experience of new designs and working with "better quality fabrics", they also have a "real possibility of improving knowledge and skills by association with larger firms if they are capable of meeting more stringent standards necessary for exported garments" (ibid.:49).

### **Forward Ties**

The Tiruppur cluster is highly differentiated in terms of the various markets it serves. Smaller firms tend to be restricted to the lower quality end of the domestic market and tend to produce more standard products (white vests and briefs in particular). Medium and larger firms, on the other hand, produced outer- as well as underwear and had taken over the higher quality, brand name identified, end of the Indian market and had penetrated markets abroad. While some of the larger firms sold under their own brand names both locally and in a few cases also in certain export markets, most firms dealt with a variety of marketing agents in the cluster.

Cawthorne (1990) identified five distinct types of marketing agents operating in Tiruppur. These were: 'selling agents' operating on small profit margins and liaising between small local producers and domestic retailers who sold lower quality items; 'depot sales agents' who acted for wholesalers; 'merchant brokers' who were the leading brand name buyers in the Indian market and held the higher quality end of domestic sales; 'merchant exporters' who were similar to merchant brokers but specialised in export sales; and, finally 'multi-national retailing contractors' who acted as agents for leading foreign retailing buyers.

The nature of forward linkages with these different agents varied. Selling and depot sales agents, for example, did not engage in technical dealings with their Tiruppur producers. Products were standardised, and there was intense price bargaining. In contrast, the various merchant brokers operating in the domestic and export markets as well as the agents of foreign buyers, tended to have closer technical liaison with local manufacturers on issues relating to design and product quality, and to prefer more regular production and contractual arrangements with their Tiruppur suppliers. Profit margins for the producers were negotiated within marketing contracts to ensure a real return of between 10- 15% (Cawthorne 1990: 173). Tiruppur's producers in such arrangements gained access to markets through such buyers as well as detailed trade related and marketing information regarding product developments, new designs and quality improvements. Many such agents maintained local offices or representatives in Tiruppur to liaise on a day to day basis with producer firms. These local representatives would, "once the order had been placed, oversee various stages of the production process". Samples were supplied to producers and checked for details, finished garments were checked locally for quality, colour-fastness and cloth shrinkage before consignments were approved for shipment to either the local or foreign markets (Cawthorne 1990:177).

Links with foreign buyers and retail chains, tended to be restricted to the larger producers in the Tiruppur cluster. Such garment producers had to keep pace with rapidly changing international design and quality requirements. It also induced extensive technical upgrading within the cluster. Swaminathan & Jeyaranjan (1994) observed that "process-wise, the sewing operations are done with the latest machines with almost 80 percent of the owners having kept pace with the developments in technology" (Swaminathan & Jeyaranjan 1994:7). While doubts were expressed regarding the quality of backward suppliers and components "which very often defeated the very purpose of acquiring advanced machines", and that with respect to the use of CAD/CAM technologies the cluster had made little headway; it was clear that not only was "the latest machinery in almost all processes of production available [in] Tiruppur" but also the know-how to use and adapt such technologies; Consequently,

“individual exporters (particularly the large entrepreneurs) had benefited considerably from technology up gradation” (Swaminathan & Jeyaranjan 1994:7).

### **3.4: Role of Institutions and Government Policy**

This is one of the more under-researched aspects of the Tiruppur story. It is clear that within Tiruppur there are a number of local representative institutions and support bodies, as well as initiatives on the part of the State, that have had an important impact on the development of the local knitwear sector. There are, for example, various macro support strategies for small scale industry in India which also apply to this sector. These provide tax benefits and subsidised credit. There is, however, no indication from the studies done on Tiruppur of the impact that these SME benefit packages have provided to local small producers. Their continued importance, though, is partially reflected in the practice of firms splitting up at reaching certain size thresholds.

In terms of more targeted institutional support to the local knitwear industry, three organisations stand out: first, the state supported Apparel Export Promotion Council (AEPC); second, local trade bodies, namely the South Indian Hosiery Manufacturers’ Association (SIHMA) and the newer, and apparently more dynamic, Tiruppur Exporters Association (TEA) that represents the city’s knitwear exporters; and third, the South India Textiles Research Association (SITRA). The activities of these institutions are briefly discussed below.

The Apparel Export Promotion Council (AEPC) acts both in a regulatory as well as a promotional role in the local knitwear industry. The AEPC was set up in 1978 by the union government to stimulate export growth and act as advisor to buyers, exporters and government. It had in the mid 1980s over 6,000 members who were all exporters, and had set up regional offices in various locations, including Tiruppur, to provide support at the door-step. In Tiruppur “the AEPC has a dual role: to administer the export of garments via the management of a quota system (which regulates the amounts that individual producers can export) and to deal with the implications of bilateral trade agreements in force with importing countries and secondly to promote the export of Indian garments” (Cawthorne 1990: 160).

Through its function of distributing quotas to firms, AEPC acquired great influence and much power in the cluster. According to Cawthorne, it was apparent that it tended to favour allocations to larger and better established firms, which may well have been a sound business strategy rather than reflective of a bias against smaller units. The AEPC “also sponsors buyer/seller meetings, organises trade delegations, individual sales tours [which it often

subsidises for smaller units] and sets up market survey teams” (ibid. 160). The council collects trade data, both locally and from abroad, and is particularly active in seeking out markets in countries where India’s exports are not quota bound (such as Eastern Europe, Latin America, and East Asia).

The local Tiruppur Exporters Association (TEA), set up in 1990, complements and underlines some of AEPC’s promotional activities, especially with respect to gathering marketing intelligence and exploring new sales outlets (such as post-apartheid South Africa). The TEA is an “association exclusively for exporters of knitwear who have production facilities in Tiruppur” (Swaminathan & Jeyaranjan 1994: 16). Swaminathan and Jeyaranjan describe the TEA as “the most important and aggressive” of the institutions currently operating in Tiruppur. In recent years it has eclipsed the Coimbatore based South India Hosiery Manufacturers Association (SIHMA), by addressing more directly the needs of Tiruppur’s knitwear export sector. The Association has 248 regular members and 134 associate members. All the leading producers and exporters of Tiruppur are active in the TEA and subscribe to the various projects that it has on stream and in plan. Among the former is a self financed industrial complex for export knitwear producers built close to Tiruppur which can house 157 units. It also proposes to set up various local infrastructural facilities for the benefit Tiruppur’s export producers in particular and for the city as a whole. These include: “an inland container terminal, a sewage plant, and a 400 line private telephone exchange” (Swaminathan & Jeyaranjan 1994).

The third institution which could well play an increasingly important role in Tiruppur is the South Indian Textiles Research Association (SITRA). The AEPC and SITRA are collaborating to set up “a research and development cum testing laboratory and training institute” in Tiruppur. This could provide two very critical inputs to the cluster which individual producers would be unlikely to be able to finance themselves. First, testing facilities for cloth and dyes to ensure that they meet increasingly stringent global requirements. Currently some of the larger foreign buyers have samples tested at independent lab facilities in Bombay. Second, the proposed R&D facility could enhance local design and screen printing capabilities for Tiruppur’s garment producers. Tiruppur’s firms have yet to acquire new micro-electronics technology, particularly CAD techniques which are increasingly necessary for complex cloth pattern making and garment design.

As with other export clusters it is apparent that local institutions, especially representative trade bodies, have played an important part in channelling relevant market, technical and trade information and know-how to local producers. In Tiruppur this has involved the arranging of trade fairs and the organisation of trade delegations to seek out new markets.

Increasingly, it would appear that such institutions will have an even greater role in raising quality standards, improving local technologies and enhancing the cluster's design capabilities. This requires a more detailed probe into how local institutions actually intervene in support of the cluster.

### **3.5: Conclusion**

As Cawthorne observes “there is overwhelming evidence of a highly spatially concentrated cluster of firms performing an interconnected range of economic activities. ...[as well as] dense inter-firm linkages and signs of collective activities” in the Tiruppur cotton knitwear sector. This has led to various forms of backward and forward inter-firm ties and as the more recent evidence suggests has resulted in not only product development (with new items of clothing being locally produced), but also technical up-gradation.

Cawthorne concludes, however, that “despite the success of Tiruppur in creating jobs and penetrating export markets, taken overall, it seems to be a case of... ‘the low road’ route to accumulation” (Cawthorne 1995:43). This statement understates the achievements of the Tiruppur knitwear sector, nor is it supported by the growth record of recent years (as borne out by Swaminathan & Jeyaranjan 1994) following the research period covered by Cawthorne.

Clearly, cheap, female, labour has been an element in Tiruppur's success. Cheap labour for textiles related activities, however, is easily available elsewhere in India. Cheap labour on its own is an insufficient explanation for the cluster's success. Clustering, the presence of numerous backward linkages, the emergence in recent years of increasingly stronger ties with forward export agents, key local institutions and a production organisation system that has raised flexibility by specialist deverticalisation have also played a part in bringing about the cluster's success and enhancing its international competitiveness.

Some concluding observations from Tiruppur, which also appear to tie in with the findings from the shoe clusters of Sinos Valley in Brazil and the shoe clusters of Mexico, are: First, the importance of external agents in particular traders in facilitating a successful switching of gear to higher value added and more quality conscious export sectors, and acting as a channel for new information and technical and marketing know-how. Second, that a process of differentiation has been set into motion through this growth trajectory. While all categories of firms, large and small, have benefited, large firms appear to have done better than smaller ones. Within a dynamic context the large firms of today were small units a decade or so ago. Thus there is clearly a growth process at work at the firm level, which may well influence the

evolving nature of production organisation within the cluster. In Tiruppur, there are signs that the process of amoebic capitalism may in fact have provided large firms with the flexibility and the devolved management structures to implement the currently preferred industrial organisational strategies which emphasise devolved management structures and more quality aware and smaller batch production systems. Third, local institutions are important, especially those that provide valuable external market information and that project the work of clusters to distant markets and buyers. These need to be further explored. Fourth, that long periods of manufacturing for domestic production, if they occur within truly competitive environments, can enhance the international competitiveness of local producers by encouraging efficiency and innovative strategies.

## **CASE STUDY 4: HIGH TECHNOLOGY INDUSTRIAL NETWORKS IN BANGALORE, INDIA**

### **4.1: Introduction**

The city of Bangalore, once a sleepy and sedate retirement haven, is today not only one of the largest and fastest growing cities in India<sup>12</sup>, but also a mecca for high technology industries. It has been described as “the city of the future, of high-tech, the leading contender for the title of ‘India’s Silicon Valley’” (Holmström 1993:20). Bangalore is the home of India’s expanding space programme, a manufacturer of high technology missiles as well as advanced computer software and information technology equipment. Many of these products are marketed globally. The city is, in effect, the scientific and engineering centre of India, both in terms of research and training as well as manufacture. Much of the recent high-tech industrial success of Bangalore is said to be directly related to the close ties that exist between various types of large, medium and small firms in a range of technology intensive industries and local specialist research, training and higher educational institutions. Bangalore is much more than a single product cluster. It has a dense and interconnected network of ties within and between high technology engineering, electronics, telecommunications, computing, defence and machine tools sectors and local institutions. Thus the primary locational advantage for Bangalore’s industries is this highly skilled human capital base, and the constant generation and flow of technology related production ideas.

This review of Bangalore’s high technology industrial networks is based on the recent study by Holmström on the city’s engineering and machine tools industries (Holmström 1993, 1994). It focuses on inter-firm ties within Bangalore’s technology networks, and the role of local scientific and technological institutions in providing technical producer services and a cadre of skilled technical workers and engineers. The first part of the review details the core features of Bangalore’s industrial network. The second part deconstructs inter-firm relations within the networks and assesses how network arrangements have facilitated local innovation and technical progress. The discussion then probes the role played by public and private institutions in Bangalore. The concluding section extracts the key policy lessons from Bangalore’s technology related industrial network.

### **4.2: Bangalore’s Industrial Networks: An overview**

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<sup>12</sup> Bangalore has a population of 5 million, and was during the 1970s the fastest growing city in India. Along with (and possibly due to) this rapid growth, Bangalore also has the dubious honour of having India’s highest suicide rate (Holmström 1993, and [Deccan Herald](#)).

Bangalore's major industries are in engineering and electronics related activities. The concentration of these sectors locally is reflected by the fact that the state of Karnataka with only 5% of the national population produced 20% of the national output of electronics in 1993 (Holmström 1993:18). Bangalore, the capital of Karnataka, is home to India's aeronautics and defence industry as well as its rapidly developing computing (both hardware and software) industry. The country's leading telecommunications enterprise (Indian Telephone Industries) is Bangalore based; and, the city is one of the leading centres for machine-tools manufacture in India. More recently the presence of highly skilled and relatively cheap (internationally) technical personnel has attracted a number of trans-national corporations to Bangalore. This practice is particularly evident in the information technology and computing software sectors where Bangalore has become an important international location for many leading TNCs, such as IBM, Philips, Motorola, Hewlett Packard, Siemens, 3M, Texas Instruments, Novell, British Aerospace, who either have their own facilities or have set up joint venture units with Indian partners (Financial Times, London, 5 October 1995). While many of these firms located in Bangalore in order to exploit the large domestic market opening up in India, most also select Bangalore as an export production facility<sup>13</sup>. Furthermore, many TNCs now rely on Bangalore based scientists and software experts to develop their global software and computing needs.<sup>14</sup>

The easy availability of relatively cheap, yet highly skilled, technical personnel will remain a key element in Bangalore's international competitiveness in the knowledge intensive sectors. While Bangalore's engineers are cheaper compared to their colleagues in the original Silicon Valley; they have also brought about a sustained process of technical innovation across a number of local sectors. Rapid technical development has been a striking feature of Bangalore's industrial landscape. The city's traditional engineering, metalworking and textiles sectors have begun to give way to "firms using newer technologies, electronics component factories, more specialised and high quality metalworking with CNC [computer numerically controlled] and CAD [computer aided design], newly equipped textile and garment factories" (Holmström 1993 :21).

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<sup>13</sup> The US electronic and information technology giant Motorola, for example, exports US\$ 100 million of pagers from its Bangalore facility (Financial Times, London, 5 October 1995).

<sup>14</sup> Motorola's "Bangalore based research centre writes software for all of Motorola's businesses" worldwide (Financial Ties, London, 5 October 1995).

The broad developments in Bangalore's technology intensive industrial sectors is charted in the table below. For many of these sectors growth was originally closely tied to large public (and a few private) sector firms; as well as intervention by a number of specialist technical institutions. In addition to generating extensive backward and downstream linkages locally, large public sector firms often acted as industrial motors driving their respective sector's growth, providing training grounds for subsequent generations of engineers and skilled technicians and acting as incubators for the development of skills and technical know-how in the industry. Among such large firms are Bharat Electronics (in the defence sector), Hindustan Machine Tools Factory, Indian Telephone Industries, Hindustan Aeronautics, and WIPRO (the large private sector computer manufacturer).

### The Development of Bangalore's High-Tech Industrial Sectors

Period	Main Development	Major Effects
Pre 1945/ 1947	Hindustan Aeronautics and of Indian (Tata) Institute of Science set up in Bangalore	Local pool of skilled technical labour
Late 1940s and 1950s	Large state enterprises set up by central government: Indian Telephone Industries, Hindustan Machine Tools, Bharat Electronics.	Generates local downstream linkages
1960s and 1970s	Specialist technical institutions set up: Central Machine Tool Institute (1961). Public sector firms joined by leading private firms in a number of sectors. Large firms encourage the setting up of 'dependent' ancillary SME units.	Localised technology cluster takes shape.
1980s	Trade liberalisation and more competitive product markets. Ancillary SMEs becoming specialised and 'independent' of large firms. Emphasis on flexibility, specialisation, precision and quality in ties with SMEs. Use of NC and CNC machine tools grows.	Beginnings of knowledge intensive technical collaboration between large firms & SMEs
1990s	TNCs enter Bangalore particularly in the computer software industry. the development of information technology and telematics sectors. Emergence of CAD/CAM technologies locally	India's 'Silicon Valley'.

Most large public sector firms date back to the late 1940s and early 1950s and were set up to provide strategic products (as in defence) or to produce under protected environments for the domestic market (as in telecommunications). Their location in Bangalore was not only a strategic choice, away from the volatile northern borders; it also drew from, and built upon, the growing concentration of specialised technical personnel and technical know-how in Bangalore that began in the late 1930s (with the setting up of the Indian Institute of Science and the aircraft manufacturers, Hindustan Aeronautics).

In the mid 1960s through to the late Seventies many of the large public and private sector firms, in order to cut costs, began to use smaller ancillary units as subcontractors and as specialist component manufacturers. Ancillary units were often set up by former skilled workers and managers of large firms with the active support of their former employers. Such SMEs, run by technically skilled and experienced engineers and technicians, undertook task-specific job-work or manufactured specific components for large client firms.

From the 1980s onwards, the nature of ties that large public and private firms had with their ancillary SMEs began to change. It would appear that the qualitative shift in these ties has a great deal to do with India's trade liberalisation policies which began to alter the domestic product market environment. With increasing competition and greater emphasis on product diversity, quality and design, firms had to improve product range and product quality. This process of upgrading and becoming demand responsive also raised prospects for exports of products and services for a number of the technically more skilled producers in Bangalore. From an earlier pattern of close patron-client ties between large firms and ancillary units, large firms shifted to using more specialised SMEs for specific tasks and to build more flexible production arrangements. While the desire for increased flexibility was still motivated by cost cutting pressures, the nature of production ties with SMEs became more knowledge intensive.

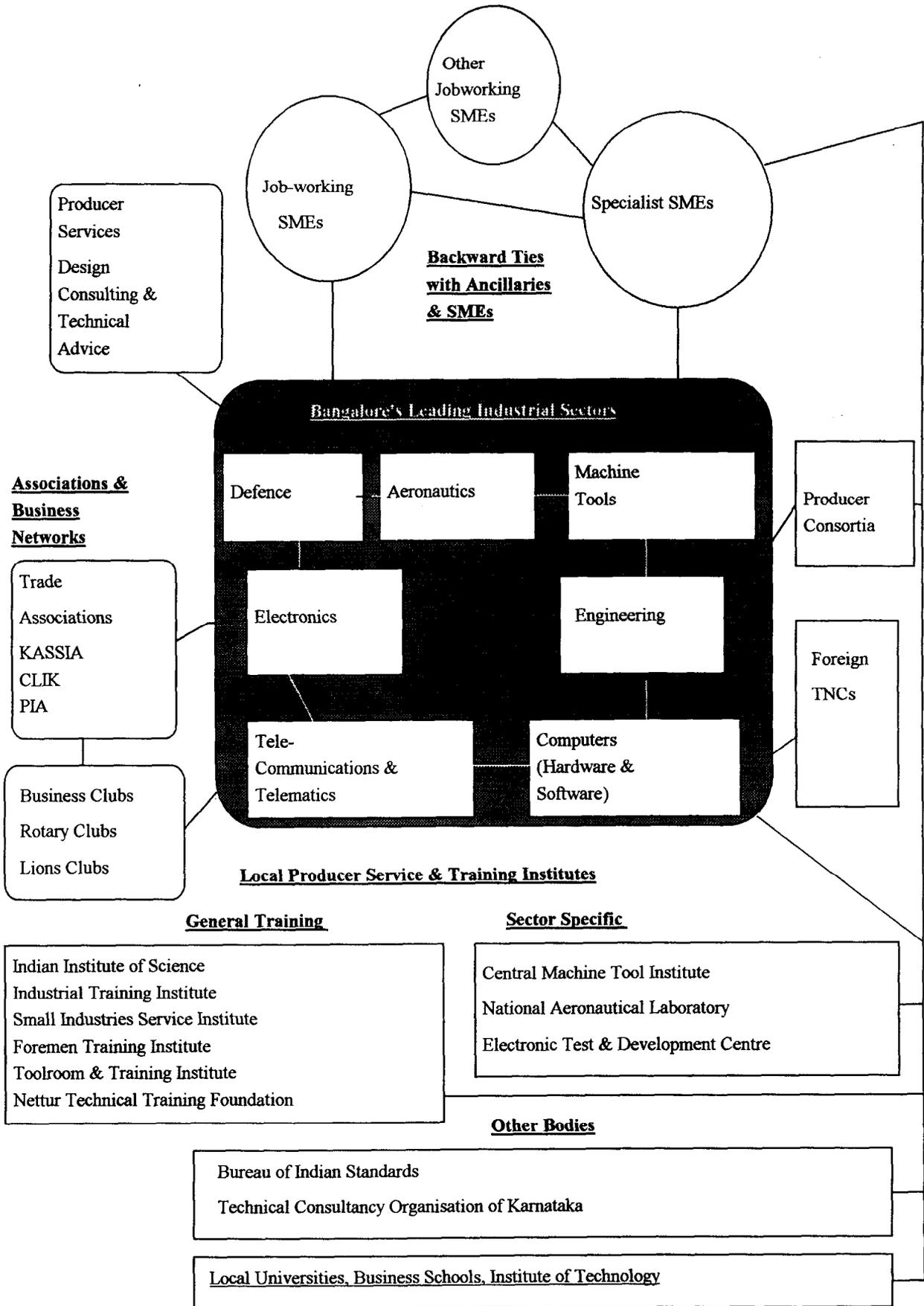
Moreover, these arrangements were part of wide and dense inter-personal networks through which firms were associated to each other and through which the flow of technical know-how and marketing intelligence was facilitated. Among these networks were those built on common schooling and alumni links, built around the many technically specialised private and public training institutions within Bangalore, between skilled workers and engineers across various firms; well as "alumni" bonds between people who had worked together in the same firms at one time or another.

The cluster map below attempts to capture some of the local and global ties within Bangalore's leading high technology industries. These include backward ties with various types of job-working SMEs as well as providers of producer services. Horizontal ties across sectors (through businessmen's clubs and via various alumni links) and within sectors (through consortia, associations and trade bodies). Forward ties, particularly with international TNCs. And finally, training and advisory linkages offered by numerous locally based technical support institutions. These organisations, run by either central or local levels of government or privately operated, offer general technical training, sector specialised training and technical advisory services or a broad range of producer services.

#### **4.3: Inter-firm Ties in Bangalore's Industrial and Technical Networks**

As the map below indicates, production ties between firms in Bangalore operate at a number of levels. There are links across sectors and within sectors. Among the former, one of the most prominent inter-sectoral ties are between local machine tool producers and firms in other sectors in Bangalore. In addition to manufacturing, or in many cases "reverse engineering" (or copying) standard machine tools, machine tool makers often custom designed equipment according to the specific needs of client firms in a range of industries in the city. Similarly, the large number of engineering firms in Bangalore (roughly one-third of all registered factories in Bangalore in 1991 were engineering concerns, Holmström 1993:19), produced specialised components for the telecommunications, electronics, computing and defence related sectors. The defence and aeronautics industries were closely associated with each other, while there were production ties and technical information flows between local electronics, telecommunications, telematics and computing firms.

# BANGALORE'S INDUSTRIAL & TECHNOLOGICAL NETWORKS



The most prominent aspect of intra-sectoral production ties within Bangalore's high-technology industries is the array of SMEs that undertake task specific job-work for large firms. In some cases SMEs were also engaged with varying levels of subcontracting arrangements with each other. Holmström distinguishes two broad types of backward linkages between SMEs and large firms in the engineering and electronics industries of Bangalore. The more predominant relationship is one where ancillary units operate under close scrutiny and direction of the large client firm. In some cases, such ancillaries had been set up with technical and financial support of the large "parent" firms, to whom they were obligated to undertake job-work on demand. Even where ancillaries undertaking job-work were independent of large firms, design and quality stipulations were laid down by the latter. In such cases innovation and product development was the terrain of the large firm, with the SMEs concerned solely with maintaining quality requirements and minimising production costs. At best some marginal product modification, which raised efficiency or improved the performance of the component or equipment being produced, would be suggested by ancillary SMEs to their client firms.

"For a small supplier to [a large firm] quality means making the components exactly according to the customer's drawings and tolerances, and of course delivery on time. That is a ceiling. No further improvement is possible, since the supplier and his workers are not involved in design and may not even know what the component is to be used for" (Holmström 1993:27). In such production arrangements, competition among SMEs (which was intense) focused on winning contracts, preferably on a long-term basis, from large firms, on the basis of price and quality. Few such job-working SMEs would incur the risks associated with product development. In effect these were dependent or hierarchical production arrangements where the technical plateau on which SMEs operated was determined by large client firms.

Nevertheless, while innovation on the part of job-working SMEs was rare, there was clear evidence that in the search for greater precision, consistency and more efficient manufacturing, most SMEs in the engineering and machine tools sectors had begun to use NC and CNC technologies. According to Holmström, having access to CNC equipment was a prerequisite for many small firms in order to win orders from quality and precision conscious large client firms. Where individual small units were unable to afford CNC machine tools, they turned to other SMEs who had excess capacity on such equipment to carry out specific tasks. Hence "there is a complex web of subcontracting relations between firms with and without CNCs, or with particular types of CNC each taking over a particular stage in production, sometimes as a regular long-term arrangement, sometimes a single order" (ibid.:37).

The less frequent examples of technically independent SMEs were those that retained their own internal design and product development capacity and had attempted, or intended, to develop and market their own products. Often these were firms run by professional engineers who were driven by a desire to innovate as much as by other commercial interests. Such small firms were particularly found in the machine tools sector where, in response to the growing demand for CNC technologies in Bangalore's engineering industry, many small machine tools manufacturers had become specialised in producing CNC equipment, in "retro-fitting" existing machinery with CNC controls, or in developing specific accessories for use with CNC technologies. While some SMEs attempted to develop their own engineering ideas, many others used "reverse engineering" techniques to copy more expensive imported machinery. Thus foreign made machine tools were taken apart and refashioned, or copied on the basis of rough sketches and drawings, to meet the specific needs of clients. Products and tools were also adapted to meet the specific needs of certain niche sectors.

For SMEs that had been able to innovate and develop (or even modify) new products, feedback from customers was essential. User's complaints and suggestions, often transmitted through the SME's maintenance and service engineers or its marketing arm, was necessary to bring about improvements in existing equipment and to spark off new ideas. Close interaction within SMEs between marketing divisions and design teams "provided the stimulus to develop new products" (ibid.:48). Some SMEs also used local trade fairs to exhibit their products and to pick up on new technical developments within the industry and to observe how other firms had improved or modified equipment. Most importantly, there was a great effort to acquire technical knowledge from abroad and for the more innovative and entrepreneurial of the SMEs to actively seek export markets. According to Holmström "the strongest impetus to improvement and innovation comes from abroad; not only because firms want to export, but because Indian customers are more willing to buy a product which has proved its worth by selling on foreign markets" (ibid.:50).

There have, however, been high costs involved as firms modernised and invested in new equipment to keep up with new requirements on quality and finish of products. Acquiring, developing and marketing CNC technologies was an expensive proposition for SMEs in the machine tools sectors and for small engineering firms. Holmström's study cites examples of a number of such SMEs which, unable to recoup their capital investments, had failed. Nevertheless, the broad trend is clear, as the products markets became more diversified and sophisticated and as the trade liberalisation programme raised quality awareness within the local market, more and more SMEs had begun to move towards specialised and higher

quality, and value added, activities. Furthermore, whether SMEs were undertaking job-work for large clients or marketing their own products there was extensive networked interaction amongst local SMEs. Thus along with competing with each other SMEs in Bangalore's machine tools, engineering and electronics sectors "also put out work to each other: manufacture of components, different stages of production, work which requires special equipment like a CNC, capacity subcontracting to meet a deadline for a large order" and so on. (ibid.53).

In some cases network co-operation amongst SMEs had led to the formation of various consortia. For example, five SME machine tool producers had set up a sales and service consortium which had six offices nation-wide and a staff of 70. The marketing and service staff not only responded rapidly to customer's needs, they also channelled feedback and user suggestions to the consortium's member firms. Each of these five component firms, which were headed by individuals who had once worked together in Bangalore's Central Machine Tools Institute (CMTI), produced distinct types of machine tools that complemented rather than competed with each other. Another example of a successful attempt to set up a producer's consortia amongst SMEs was that of ANCO in the telecommunications sector. This consortium, which had 40 SME member firms, emerged when the large public sector firm Indian Telephone Industries decided as part of its modernisation and product development programme it would cease to rely on ancillaries. The affected ancillaries responded by forming a consortium (ANCO) to design and develop new equipment in order to win back work from ITI. With the growth of the info-tech sector this consortium of innovative small firms had been able to expand into developing other telecommunications products (ibid.:64).

#### **4.4: The Role of Institutions in Fostering Network Ties**

One of the striking features of Bangalore's high-technology industrial networks is the large numbers of specialised technical institutions in the city. Some of these are privately run. Most, however, have been set up by state or central levels of government. There are also local trade bodies and business associations. Some of these public and private organisations are depicted in the map above. Certain organisations provide sector specific support while others provide a more general set of producer services. Possibly of greatest significance is the large number of training and technology intensive educational institutions in Bangalore.

Among representative trade bodies of SMEs in Bangalore are the Karnataka Small Scale Industries Association (KASSIA), the Consortium of Electronic Industries of Karnataka (CLIK), and the Peenya Industries Association (PIA) which brings together firms in various

sectors located in the large Peenya industrial area of Bangalore. On the whole these institutions lobby government on behalf of members, provide technical and marketing advice, put members in touch with suppliers and foreign markets, publish newsletters and encourage members to form consortia in order to achieve co-operative gains. "Some trade associations have more ambitious plans to set up their own technical, quality control or marketing services" (Holmström 1993:67). There are also business bodies such as Rotary and Lions Clubs which bring together industrialists across various industries and provide important forums for commercial contacts.

Holmström does not, however, evaluate in depth the workings of trade bodies in Bangalore and gives more attention to the various technical institutes in Bangalore which are very active. Amongst the sector specific institutions the Central Machine Tools Institute (CMTI) is particularly noteworthy. Set up in 1961, it is recognised as having played a pivotal role in the development of Bangalore's machine tools sector. CMTI provides technical advice, testing facilities, designs and modifies machine tools on request and pioneered research and development on CNC technologies in India. Recognised as a technology trend-setter in Bangalore, it currently provides computer aided design/manufacture (CAD-CAM) services and is developing computer integrated manufacturing (CIM) technologies. CMTI has also been an important training ground for Bangalore's engineers and product designers, and there are strong alumni links that bond generations of CMTI graduates. "Some of the most innovative and successful engineering firms in Bangalore were founded by CMTI designers who know and trust each other, and exchange ideas and services" (ibid.:72).

Bangalore also has a number of institutions that provide general producer services and serve the range of high-technology industries. The Bureau of Indian Standards, for example, a public sector body, acts as a testing facility for ISO certification and has encouraged a number of local firms to obtain ISO 9000, 9001 and 9002 international quality standard certificates. The Technical Consultancy Services Organisation of Karnataka (TECSOK) provides technical advice and undertakes feasibility studies for smaller firms in Bangalore across a range of activities.

The largest numbers of institutions are those geared to technical training functions as well as a range of producer services. "Bangalore's Small Industries Services Institute played an important part in building up the dense network of small engineering workshops in industrial estates and back streets" (Holmström 1993:69). SISI runs training courses for workers as well as technical and marketing services for local SMEs. The Foreman Training Institute and the Toolroom and Training Institute (the latter being a part of SISI) provides training programmes and skill building courses for skilled technicians and blue collar workers. There

are also private sector initiatives, such as the Nettur Technical Training Foundation (NTTF) which runs four year diploma courses in tool and die-making as well as in CNC programming and CAD. Finally, the Indian Institute of Science, local universities, business schools and the prestigious Indian Institute of Technology (IIT) provide both specialised training for engineers and other professional staff, as well as actively engage with leading firms in Bangalore to further research and development goals.

#### **4.5: Conclusion**

Unlike most cases of innovative cluster-based or networked SMEs from the South, Bangalore's development as a centre for technology intensive industries with extensive SME presence is largely a result of an initial (and strategic) locational decision on the part of the central government. This was followed by public sector investment in large enterprises within technology intensive sectors and in key support institutions. These government-led interventions set into motion a process whereby over a space of three decades backward linkages developed, large numbers of skilled technicians and engineers who's training matched that found elsewhere in the world were produced, numerous SMEs producing components or acting as job-working subcontractors emerged, and high technology industrial players, both local and global, opted to locate in the city.

Within this process, Bangalore's SMEs flourished in various types of relationships with larger firms and as independent producers. Network ties, based on common schooling and the experience of having previously worked together, built a basis for collaboration amongst SMEs, and between SMEs and client firms. These bonds strengthened smaller firms and enhanced their ability to technically progress as well as compete.

The Bangalore case study has shown how SMEs have been able to technically upgrade, and in many cases bring about product innovations. Although large firms turn to job-working ancillaries mainly due to the flexibility and cost savings that SMEs offer, increasingly stringent requirements in both domestic and foreign markets for consistent quality and precision work has meant that SMEs have consistently had to upgrade their technical capabilities. The use of computer controlled machine tools is widespread and the use of CAD techniques is growing. These more sophisticated production requirements have also led to a more dense set of process specialised subcontracting linkages amongst SMEs. The presence of large numbers of highly trained engineers operating many of Bangalore's various engineering and electronics firms has also provided an impetus to efforts by SMEs to modify and/or develop new products. A common aspect of innovation amongst Bangalore's machine tool producers is the practice of "retrofitting" conventional machine tools with numerical and

computer programmable controls, and of developing equipment to meet the specific needs of niche users.

Innovative strategies by SMEs manufacturing their own products (as opposed to purely job-working SMEs whose technical horizons tend to be determined by the requirements of clients) have been more successful where they have been integrated with marketing strategies. The marketing “front office” can play a key role by acting as an interface, channelling feedback, complaints, suggestions and new ideas from clients to designers and engineers in the “back office”. Marketing efforts, allied to technical and product innovation, also appear to be more successful when incorporated into consortia that bring a number of SME producers together. Consortia, however, have been prone to failure being torn apart by divisive competitive tendencies amongst group members. They have been more effective in meeting their objectives when member firms are not in direct competition, with each other but producing complementary goods or services.

The review of the Bangalore networks has revealed two further observations. First, that large, in this case public sector, firms have played a pivotal role in the development of their respective sectors in Bangalore. Second, and allied to the above, that certain forms of institutional intervention, particularly in the field of training, scientific research and education, not only strengthened the technical capacity of Bangalore’s industries as a whole, but also provided the basis for ties that strengthened production network arrangements within Bangalore’s high technology industries.

## **CASE STUDY 5: LARGE FIRM-SMALL FIRM NETWORKS IN SOUTH KOREA'S ELECTRONICS INDUSTRY**

### **5.1: Introduction**

The South Korean development strategy is considered unique among the newly industrialised countries for its focus on large firms (Amsden 1989). Korean “Chaebols”, or large multi-sector conglomerates (in some ways similar to Japan’s “Ziabatsus”), are said to have been the engine behind the country’s industrial and technical growth (Hobday 1995). The four leading Korean Chaebols (Hyundae, Samsung, Daewoo and Lucky GoldStar) are not only amongst the biggest global electronics producers, but also rank amongst the top fifty companies in the world. In their ambition to be bigger than each other, the Chaebols continue to expand through product and sectoral diversification -- in sharp contrast to the current wisdom of down-sizing and industrial devolution (Hobday 1995).

Recent evidence suggests that small and medium sized firms are also gaining in prominence in the Korean industrial economy.<sup>15</sup> Korean SMEs, however, remain closely tied to, and actively supported by, large firms. In the electronics industry in particular, most SMEs, although technically independent, tend to be a part of tightly structured and multi-layered vertical intra-firm production networks orchestrated and governed by the leading Chaebols (Ernst 1994). Such networks are said to have led to qualitative improvements in technical learning, product and process development. Larger firms benefit from the flexibility, especially in terms of labour costs, and the specialised skills and knowledge that small units offer, while SMEs are able upgrade through the financial and technical support offered by large firms.

Along with the prominence given to the large manufacturing conglomerates, the Korean industrial development strategy is also known for the active interventionist role taken by the State in shaping industrial, trade, investment and technical policies of manufacturing enterprises (Amsden 1989, Appelbaum & Henderson 1992, Chowdury & Islam 1993). Does this approach have much significance for industrial development in other developing nations in general, or SME development in particular? Searching for “blueprint” strategies is a fruitless endeavour. Nevertheless, the Korean experience suggests that there are lessons to be learned on small firm development. These are both at the level of state policy, and the role large firms can potentially play through synergistic industrial networks with small firms.

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<sup>15</sup> Small and medium scale firms in Korea are defined as those employing less than 300 persons (Cho 1994).

The exploration of Korean large firm/small firm industrial networks and their implications for the technical development of SMEs is based on a case study by Cho (1994). Before outlining the findings from the Cho study, which details production networks in electronics firms of the Lucky Gold Star group, it is worth noting the growing importance of SMEs in Korea's industrial structure, This is done in the following section. The discussion then turns to the case study of inter-firm production networks that tie SMEs with Gold Star Audio (GSA), a subsidiary of the Lucky Gold Star group. The nature of production ties in the network are explored and their implications for technical growth of the collaborating small firms probed. The concluding section brings out some of the key policy lessons arising from the Korean experience, particularly the role of state policy.

## **5.2: Significance of SMEs and Large Firm-Small Firm Networks in Korea**

While the numbers of large firms and employment levels in large manufacturing units declined in Korea between 1985 and 1992, the share of employment, output and value added held by SMEs in Korean manufacturing industries rose. In terms of value added, the proportion generated by SMEs increased from 37.6% in 1985 to 47.6% in 1992. Yet small firms in Korea have not grown in isolation of large firms or of each other. The expansion of SMEs is linked to the growth in subcontracting. According to Cho "80 percent of all small firms produce over 80 percent of their output under subcontracting contract" (Cho 1994:6). Subcontracting practices abound in all sectors. In the automobile industry the number of subcontracting firms rose by 30% between 1985 and 1990, while subcontracting was a common feature in the textiles industry, (Cho 1992). Within the electronics industry 70% of SMEs are said to be subcontractors (Ernst 1994:54).

Moreover, subcontracting is multi-layered with vertical production arrangements that consist of subcontracting ties from:

- foreign firms to large Korean firms;
- the large nodal Korean firms to local SMEs as well as firms in low waged economies (especially mainland China);
- among SMEs;
- SMEs down to low waged female and elderly homeworkers.

Such vertical hierarchies would suggest that cheap labour is a key element of the advantage in subcontracting. The nature of subcontracting ties are, however, changing. In its current stage of development the Korean corporate economy is one where large firms, having externalised some aspects of production to small firms as a consequence of labour pressures (arising from the labour unrest of the mid to late 1980s), are beginning to focus on the

technical advantages that verticalised production networks offer. The large firms concentrate “on the technically intensive aspects of production and on design and product development while . . . the production of standard commodities are handed over to hitherto subcontracting firms which rise to new leading firms, owing to their mastering of principles of production technologies in collaboration with other small firms,” and through technology transfers from large to small firms often supported and regulated by the State (Cho 1994:9).

At the lower rungs of the vertical production hierarchy, namely ties with small firms and female and elderly homeworkers engaged in labour intensive tasks, large firms seek to minimise production costs. At the higher rungs, such as ties with technically strategic subcontractors as well as with other support institutions, large firms seek “to secure innovative inputs for production” (ibid.: 11). The latter type of vertical linkages require regulatory systems that instil and encourage an ethos of co-operation. Such regulatory mechanisms include Chaebol specific business co-operation associations (the “Hyupryukhoe”) through which strategic SMEs are brought under the technical support umbrella and corporate culture of the large conglomerate.<sup>16</sup>

Furthermore, most “large firms operate task forces in charge of governing a whole range of subcontracting affairs, [including:] price setting, design specification, technology upgrading, delivery conditions, even subcontracting firms’ wages etc. In order to assist small firms in meeting the requirements, large firms offer high-priced machines, raw materials, parts and finance and often send technicians to supervise technical quality.” Moreover, large firms draw on the technical skills, initiatives and ideas of strategic SMEs. This leads to “mutual negotiation of technical specifications and standards, common facility use, joint R&D, joint skill training, cross investment, joint export, joint overseas investment and so on. To encourage all these, value added communications networks are built among small firms around the command height of lead firms, through which regular production specifications are released to each other and discursive communications flow among actors” (ibid.:13).

In addition to attempting to actively promote SMEs, the Korean State has also sought to regulate ties between large firms and SMEs, especially those motivated by costs reductionist as opposed to technically strategic concerns. Amongst promotional strategies adopted have been the reservation of specific activities, or “business territories”, for SMEs only and raising commercial bank lending to SMEs (Ernst 1994). Regulatory measures include “legal stipulations concerning ‘minimum duration of contracts’, ‘ban on arbitrary change of unit costs’, ‘fair terms of payment’... [with the possibility for SMEs to take] unfair deals and

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<sup>16</sup> According to Cho 18% of the 30,000 SMEs undertaking subcontracting tasks for 103 conglomerates in 1994 “were affiliated to 68 Hyupryukhoe” (Cho 1994:13).

contracts enforced by large firms” to a Fair Deal Supervision Committee under the Prime Minister’s control (Cho 1994: 14).<sup>17</sup>

### **5.3: The Case of the Lucky Gold Star Network**

Gold Star Audio (GSA) is a part of the Lucky Gold Star conglomerate, the third biggest Chaebol in Korea with interests in a number of sectors. GSA, one of the smaller units in the group with a labour force of barely over 1000, produces audio related electronic consumer goods.

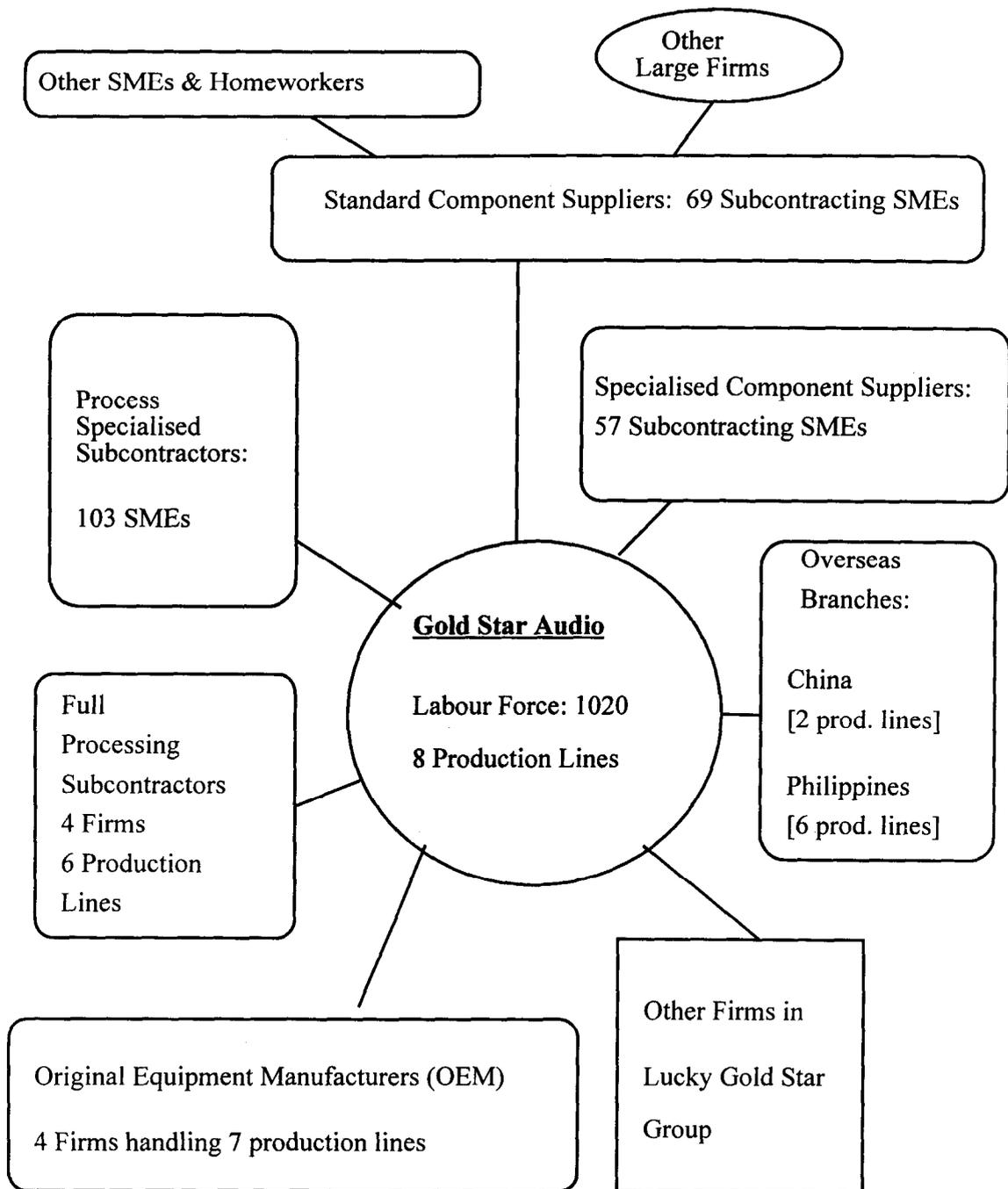
Cho’s study shows GSA as having undergone a systematic process of restructuring of its production organisation, with an emphasis on down-sizing to enhance efficiency and sustain its competitiveness. Between 1992 and 1994 GSA’s production lines have been reduced from 37 to 8, the workforce has been halved, productivity has been raised by 40%, exports raised to three-quarters of output and production organisation reorganised from Taylorist lines to a more cellular and technically more skilled system. This has meant extensive externalisation of aspects of production to various types of local subcontractors and subsidiary units in low waged economies (of China and Philippines). GSA’s new system of production organisation which hinges on in-depth inter-firm production networks is represented in the chart below.

As part of its restructuring programme, GSA was repositioned within the conglomerate as a strategic business unit. Greater powers were delegated to GSA’s management, although critical, strategic and technical decisions as well as overall financial control remained within the group headquarters.

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<sup>17</sup> Cho provides no evidence of how effective such high profile government interventions are. Ernst, however, suggests that such support has tended to favour “a few relatively large SMEs that enjoy strong ties with the leading Chaebol. Many of these small businesses are becoming ‘mini-chaebol’ by branching into various businesses, [yet] they keep each of these companies small to maintain access to cheap credit”. (Ernst 1994:55).

**GOLD STAR AUDIO'S INTER-FIRM PRODUCTION NETWORK**



Source: Based on Cho 1994

Of the 37 original product lines, 21 have been put out to various types of subcontracting units. In addition the firm has begun to rely more heavily on subcontractors to supply some 36,000 components used in the manufacture of its forty major products. This has meant that the “stable management of procurement and purchasing linkages (i.e., network) is more

than the efficient operation of production lines per se. In fact 60 per cent of GSA's 1000 employees are involved in what they term 'indirect production', the largest group of which is the managerial staff for supervising material procurement, subcontracts, inter-firm co-operation and the like. Of these, the core is the 'Material Task Force Team'" (Cho 1994:21). Moreover, GSA introduced a "market linkage production system" in tandem with its own 'business co-operation association' to ensure greater flexibility and closer ties between itself and the various SMEs engaged in its production network. These ties, which represent the first layer of subcontracting (i.e., firms that have direct production ties with GSA), vary according to the types of firms and the nature of production tasks they undertake. These are presented in the table below:

Nature of Ties in GSA's Production Network:

Type of Unit	Ties with GSA
O.E.M Firms <sup>18</sup>	OEM units provide own technologies and manpower and produce whole products. Core materials, parts, technologies, design and iron mouldings from GSA
Full Process Subcontractors	GSA provides machines, technicians, parts and materials
Overseas Branches	Produce low-tech goods for local sales or export to other LDCs
Component Subcontractors Category 1: 103 units Highly skilled iron & plastic moulding specialists.	GSA provides design & moulds as well as technical consultation and advice for improvements
Component Subcontractors Category 2: 57 units Circuit board assemblers	GSA provides technical assistance, on-site service, financial subsidy. Close and stable ties with units.
Component Subcontractors Category 3: 69 units Standard component producers	Also have ties with other SMEs & homeworkers as well as with other large firms.

Source: Cho 1994

In terms of technical ties, those with the OEM firms and full process subcontractors are extremely close in that GSA provides a number of components, designs, in some cases machinery and technical expertise. Furthermore, the first and second categories of component producers are also close to GSA in that most of them are defined by GSA as "co-operation firms" which enhance the nature and depth of the relationship with GSA. Such firms tend to only undertake work for GSA. Contracts are long standing, initially for 6 months to a year and after that over a period of years, and the relationship is recognised on both sides as being

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<sup>18</sup> Original Equipment Manufacturers are subcontractors who produce finished products to the exact specification of the buyer, with the buyer marketing the product under the buyer's brand name

both sides as being of a relatively stable nature. Some of these firms (49) are also members of Gold Star's Business Association, "Sungruckhoe" (or Star Power Association). Membership of this body adds to their status and further cements their functional role within the network. Furthermore, Gold Star's on-line information exchange network, which links GSA with close to half of all its subcontracting firms, also plays a key part in facilitating and accelerating the flow of information between various parties within the network. Through GISVAN (or Gold Star Information System of Value Added Network) "daily and monthly information about production objects, parts in need, new model, new technical requirements and so on cross flow between lead and follower firms" (ibid.:23).

#### **5.4: Conclusion**

The Korean industrial development strategy has been marked by the dominance of large firms. While this clearly persists, there is growing evidence that as large firms restructure in order to enhance their flexibility and be able to respond more rapidly to shifting market trends, they are beginning to rely more extensively than before on local and foreign SMEs. Using subcontracting, smaller firms lower wage and management costs. The GSA case study suggests that it can also involve a technical dimension resulting in the enhancement not only of the SME's technical profile but also add to the technical strength of the lead firm by drawing on the initiative and specialised know-how of the small firm.

It has been suggested that one of central weaknesses of the strategy among Korean Chaebols to vertically integrate has been that "the small and medium sized enterprise sector was [left] underdeveloped... [consequently] most South Korean SMEs were low-technology, low-cost producers, not yet capable of playing a very dynamic role" (Hobday 1995:64). This would imply that the synergies to be had from close ties between large firms and SMEs, so critical to technical innovation in Japan, has remained outside the purview of large Korean firms. Ernst suggests, that SMEs in the electronics sector by virtue of being tied to particular chaebols, have lost (or lack) a truly independent design capacity and have a "very limited decision autonomy" which hampers their international competitiveness. Levy (1994) argues that the emphasis on seeking external (foreign) ties and sources for technical learning among Korean SMEs "can be interpreted as a substitute for the relative weakness of vertical inter-firm relations as a channel for learning" (Levy 1994:28).

These comments indicate that Cho's study needs to be treated with caution in that it may not depict a typical practice in Korean industrial organisations. Nevertheless, Cho's case study clearly suggests that a change is taking place in the form of industrial organisation dominant in Korea. It, however, leaves a number of questions unanswered regarding the actual nature

of inter-firm ties within production networks, the regulatory functions and workings of the business association, the ways in which technical dialogue have actually led to an enhancement of the capabilities of collaborating SMEs, and, finally, how the State has actually influenced the workings of the production networks.

Despite these caveats, the Korean example again brings into the discussion on innovative strategies for SME development, the role of large firms. The Korean inter-firm networks emphasise that ties between large and small firms need to be addressed. While such production arrangements are likely to be paternalistic and hierarchical, with the large firm as the initiator and orchestrator of the relationship, they can in some cases assist the flow of technical know-how to SMEs thus encouraging the latter's technical upgrading. Technical support from large firms to local SMEs through sustained ties, and the importance of Chaebol Associations for regulating and encouraging such forms of collaboration needs to be explored further.

Finally, the Korean story reasserts the importance of understanding the potential role of government in encouraging technical collaboration through legislation to protect SMEs from exploitation by large firms and via support to large firms to enter into collaborative arrangements with SMEs. The State versus Market debate is well developed in the context of the East Asian miracle (Wade 1990, Amsden 1989, World Bank 1993). What this discussion suggests is that as the market forces large firms to restructure in the face of new competitive pressure, State intervention, in the form of regulatory and support measures, could be of importance for encouraging collaborative networking between large firms and SMEs and for enhancing the technical capabilities of SMEs.

## CONCLUSIONS AND POLICY IMPLICATIONS

There has been a great deal of interest in recent years on the ability of SMEs from the South to follow innovative and competitive growth paths within the framework of sectorally specialised clusters and industrial networks. These experiences have spurred both academic researchers as well as the SME support community.<sup>19</sup>

Nadvi and Schmitz's (1994) review identified clustering as an important element of small firm production organisation in the South. In many cases it was observed that clustering provides small producers grounds for competitiveness that went beyond the traditional advantage of cheap labour. Inter-firm relations that were set in motion through clustering and networking often alleviated constraints that SMEs traditionally faced. Small enterprises were able to gain access to inputs, made connections with buyers, and overcame technological discontinuities. Alongside these externality gains of clustering, the constant flow of technical know-how and marketing intelligence as well as intense local rivalries spurred attempts to technically innovate and enhance competitiveness. Such tendencies were further strengthened through various forms of joint action and through the intervention of local technical institutions providing "real" producer services.

Humphrey and Schmitz (1995) in their recent paper have brought further policy insights from some of the most recent attempts of fostering clustering and networking. They put forward the notion of the "Triple-C: customer-oriented, collective and cumulative" as being the critical elements of a strategy promoting SME networks and clusters. As they say, a focus on the collective (cluster or network), rather than the individual firm and on a demand oriented strategy not only "lowers transaction costs and enhances mutual learning", but is also "more likely to achieve cumulative improvement in competitiveness".

This paper, by focusing in greater detail on a handful of the longer established and successful examples of technically innovative and internationally competitive SME clusters and industrial networks from the South, reinforces findings from earlier studies as well as raising some new observations. As a caveat though, it has to be noted that evidence from the field is still uneven. A number of questions remain unanswered or at present can only be partially addressed. Furthermore, in focusing attention on inter-firm production and marketing ties and the role of institutional and policy intervention in encouraging technical development, a number of other themes have not been touched upon in this paper. These include, for

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<sup>19</sup> Interest amongst development practitioners is reflected in the collection of papers put together by UNCTAD/GTZ and the series of country case studies recently commissioned by the ILO's Technology Branch.

example, the implications for labour, especially for marginalised groups in the labour force such as women and children, that arise from such forms of flexible production arrangements; as well as the importance of the overall social milieu in reinforcing collective productive capacities of industrial clusters and networks.

The broad conclusions that emerge from this review of five case studies are presented in the table below. A number of common themes stand out. In each case study it appears that for small producers to develop into competitive forces, links with large firms, ties with external agents and the presence of local support institutions have been of great significance. In contrast, the experience of intervention by the State is rather mixed, although the existence of a number of physical and infrastructural constraints suggest that the State's role as a facilitator and an enabler for small producers cannot be underestimated.

Most important of all is that there is evidence, of varying degrees no-doubt, that SMEs in each case study have experienced growth, have managed to penetrate into highly competitive export markets, and have technically progressed, either by moving up the value added chain, acquiring new technologies and/or innovating in products and process organisation. These achievements have been aided by extensive backward and forward interlinkages and forms of collective action among SMEs within their respective clusters and networks. In each case there are signs that small firms with limited resource endowments have benefited from significant economies of agglomeration, that have lowered transaction costs and raised economies of scale and scope, as well as obtaining advantages of collaboration through various forms of network or cluster-based joint action. Such networked linkages and inter-firm relations between agents both within and outside the cluster have not only raised the economic efficiency of SMEs but, in most cases, have also raised prospects for sustained competitiveness through a process of innovation and technical development. In short, each case reflects the collective efficiency advantages that small producers can obtain when not operating in isolation, but as part of a larger, local, productive system.

<b>Key Features and Conclusions</b>	<b>Brazilian Shoe Cluster: Sinos Valley</b>	<b>Mexican Shoe Cluster: Guadalajara &amp; Leon</b>	<b>Indian Cotton Knitwear Cluster: Tiruppur</b>	<b>Indian High Technology Industrial Networks: Bangalore</b>	<b>South Korean Chaebol Networks</b>
Evidence of SMEs Growing and Technically Advancing	Yes	Limited	Yes	Yes	Yes
Nature of Markets	Demand-led	Demand-led	Demand-led	Demand-led	Demand-led
Key Players	Foreign Buyers		Buyers	Large Firms & TNCs	Large Chaebols
Are Large Firms Important?	Yes	Yes	Yes	Yes	Yes
Role of the State	Limited	Limited	Limited	Important	Important
Role of Local support Institutions	Important	Limited	Important	Very Important	No local but some central/ chaebol institutions
Key Constraints	Infra-structure		Infra-structure	Infra-structure	

Let us now turn, in greater detail, to some of the common themes that come out of these case studies, in order to reflect on policy agendas for supporting cluster and network based SMEs.

Growth, economic success, and changes in production organisation in each case has been brought about by demand-led market conditions that have forced producers to be flexible and responsive to quality requirements. In most cases such demand pressures have been associated with trade liberalisation strategies aimed at providing what Humphrey and Schmitz (1995) refer to as “demanding customers”, both locally and globally, with greater choices. In meeting the needs of such demand-led markets, and in adopting a demand side approach whereby small firms respond rapidly and flexibly to market developments, face competitive threats and seek out new opportunities; key institutions have been those that facilitate the link between producers and markets.

Market agents such as buyers and foreign traders, as well as institutions such as trade fairs have been of great importance in providing SMEs with access to fashion and product design information and general market intelligence. In Sinos Valley, for example, the trade fair organisation FENAC “helped to forge the link with the market. Once made, the export agent became the critical figure in making the connection between local producers and international markets” (Humphrey & Schmitz 1995:15). Levy’s comparative study of SMEs across four countries also found that “firms ascribe a high value to participation in trade fairs at home and abroad as a means of penetrating export markets” (Levy 1994:20). Levy found that trade fairs were the leading source of “export marketing support” and technical learning. This is not to suggest that holding trade fairs is in itself a panacea for achieving export growth for SMEs, but that SMEs have to interface closely with their markets, at home and abroad, in order to remain competitive and to grow. While trade fairs can as Humphrey and Schmitz (1995) note “have a catalytic effect”, different markets clearly behave differently. “For some high profile fairs are the high points of the trading season, for others an ongoing search by individual buyers and sellers for trading partners matters more” (Levy 1994:20).

Trade liberalisation programmes and increasing globalisation of markets have been a key motivator in pushing small firms towards a more demand responsive approach. In Brazil demand pressures brought about by the so-called “Chinese Shock” is forcing Sinos Valley’s shoe producers to upgrade and seek higher quality markets. In Mexico the trade liberalisation programme and the NAFTA accord is making a previously supply driven shoe industry aware of the need to adapt to the quality dictates of a demand led market. Trade reforms in India have opened up the prospects for high technology exports and collaborative links with leading TNCs by Bangalore’s knowledge intensive sectors. In each of these examples SMEs have been a central element of change. Although no control studies exist, the evidence is strong that in each of these cases clustering and networking has enhanced the ability of SMEs to compete and grow in these new market environments in a way that would be difficult, if not unfeasible, for SMEs operating in isolation.

These findings, that liberalisation and globalisation is forcing the pace of industrial development for SMEs, that demand led product markets and market agents are crucial to the adoption of a competitive and sustainable growth path for SMEs, and have been the motor driving intra- and inter-firm reorganisation, parallels those of Weijland (1994), Levy (1994), Humphrey & Schmitz (1995) and Tendler & Amorim (forthcoming). They emphasise the need to focus on demand driven models in SME support strategies.

Another conclusion that emerges from this study is that, in addition to market agents (especially forward linkages with traders and foreign buyers), large firms are a significant

element in most Southern industrial clusters and production networks. This implies a need for a more holistic approach in analysing and promoting SMEs which sees small enterprises as being linked with, rather than functionally separated from, larger enterprises.

Large firms have been particularly influential in the two network case studies, Bangalore and Korea. The key element here has been the supply networks and linkages that have been forged between large and small firms. From the cluster experiences it is also clear that many of the large firms of today were till recently SMEs. Their expansion underlines the growth potential of SMEs.

These observations raises questions regarding both inter and intra-firm production organisation. Moves that enhance flexibility, increase responsiveness and raise quality standards are of growing importance in maintaining competitiveness. Investing in supply networks and upgrading small suppliers such that they can meet the quality requirements and tight delivery schedules of large producers and make the first steps towards a just-in-time (JIT), total-quality-management (TQM) production system is one of the key policy conclusions that emerge from the Humphrey & Schmitz (1995) study. Our findings also underline the need to incorporate large firms, in particular their linkages with small producers and component suppliers, as agents of change and as an integral element of SME development strategies.

In terms of intra-firm reorganisation there is evidence across most of the case studies of down-sizing, moves towards cellular production systems, reduction in inventory stocks, a greater emphasis on subcontracting for both labour cost-savings and technological advantages, and a real focus on monitoring quality at each stage of production. These forms of intra-firm reorganisation are most apparent in larger units, but are also observed within SMEs and in the relations that large firms have with SMEs. In Brazil's Sinos Valley, for example, large shoe manufacturers in adjusting to changes in market demand for "smaller orders, shorter delivery times and higher quality requirements... [have] shifted their emphasis from growth to internal reorganisation. Production departments, the size of football fields are being broken down into mini-factories;... cellular manufacturing is beginning to be applied. The hiring and firing of labour is beginning to make way for investment in human resources and reducing labour turnover" (Schmitz 1995a:15). Similarly, Rabellotti found in Mexico's shoe clusters that producers, both large and small, were beginning to move away from conveyor belt production lines to pair-by-pair process flows operating with smaller batch sizes and greater quality control. The Korean network case study of GSA is an example of the restructuring by a large producer to one which has close collaborative and technical ties with a range of smaller producers and component suppliers. While this process of

restructuring lowered costs and enhanced productive efficiency, it also opened up possibilities for mutually advantageous technical collaboration. This was most potently represented in GSA's computerised knowledge sharing inter- and intra-firm network GISVAN.

These findings on intra-firm reorganisation underline Humphrey's (1995) call to bring the separate literatures on clusters and networks among small firms and that on internal restructuring of large firms together. To date much of the empirical work on small firm clusters has focused on inter-firm relations, while studies on large firms have tended to be weak on linkages with small suppliers. What is clear, however, is that large firms are an important element of industrial networks and clusters. They benefit from being part of such industrial environments by drawing on the collective resources available within such settings. Moreover, as large firms restructure as part of JIT/TQM strategy, their linkages with smaller suppliers become a key area for technical development of SMEs and for collaborative action.

Let us now turn to the broader question of policy intervention and the role of government.

### **A Role for Government**

The role played by the state in the development of the reviewed clusters and networks varies. With the exception of the Bangalore and the South Korean examples, central government intervention has been a limited factor in cluster or network development. Central government agencies or departments have been influential in the Mexican shoe clusters (e.g., the Ministry of Industries "empresas integradoras" programme to promote horizontal collaboration) and in Brazil's Sinos Valley (such as the national and semi-public SME support agency SEBRAE and the vocational schools run by the national SENAI programme). Nevertheless, local institutions and representative business organisations appear to have been of greater significance in developing and providing support services. These initiatives raised the technical capacities of enterprises in clusters and networks, improved the flow of technical and marketing know-how, and provided key producer services in managerial, financial and technical arenas.

Does this mean then that there is a case for the "benign neglect" by the State for SMEs in such settings? Evidence from a wider coverage of case material than that presented here suggests not. Before we turn to some of these examples, two points need to be stated. First, state intervention can at best only serve to aid clusters and networks that already exist in a nascent form. Evidence of successful public intervention to set up, by fiat, such forms of

production organisation are rare.<sup>20</sup> Second, public institutions and programmes for the support of SMEs are likely to be more relevant and sustainable when there is an active involvement by the very parties for whom they are being set up. This requires a devolved strategy for policy formulation and implementation. One that forms organic links at the local level between representative institutions of industry, such as trade associations, and the institutions and support agencies of the State. That is to say a partnership between private self-help bodies and local government.

This implies a focus on the potential role that can be played by municipal and regional levels of government. That is to say, while macro policy frameworks formulated by central government, such as trade and sectoral policies as well as fiscal regimes are clearly influential for the development of SME clusters and networks, meso-level programmes initiated are equally important.

For example, as Tewari (1990) has shown, the rapid development of small scale industry in Ludhiana, in the Indian Punjab, has a great deal to do with the concerted intervention by regional government. Following the economic upheaval that arose from the partitioning of Punjab between India and Pakistan in 1947, initial assistance by the regional government took the form of “encouraging self-employment [by] financing skilled workers/artisans to start up their own shops [by providing] minimalist credit to those who had basic skills”. This policy generated “a large number of small private firms in sectors such as metalworking, hosiery, machine tools [and] cycle components” and encouraged industries to subsequently locate in Ludhiana (Tewari 1990:28-29). Once industrial activity was flourishing the Punjab government established a number of institutions in Ludhiana during the 1960s with the overt purpose of supporting local industry to technically upgrade. These included quality control centres, vocational and industrial training institutes, and research and technology centres (Tewari 1990).

Another example of the effectiveness of regional government intervention comes from the Brazilian State of Ceara. Here the local government, in conjunction with the SME support agency SEBRAE, was influential in promoting the development of a local woodworking cluster through a demand led procurement programme and a policy aimed at encouraging producers to organise and operate in groups (Tendler & Amorim, 1996). This strategy not only led to rapid employment growth, but also facilitated patterns of technical learning among local small producers. As a consequence of this intervention “the number of saw mills in the town rose from four to 42” and total employment in the sector from 12 to over 1000

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<sup>20</sup> The small woodworking cluster of San Joao de Aruaru in the Brazilian state of Ceara, cited by Tendler & Amorim (forthcoming), may well be one of these rare exceptions.

(Tendler & Amorim, 1996). The cluster's small woodworking units began to acquire mechanised technologies and to sell to neighbouring states. The success of this programme suggest, as Tendler & Amorim point out, that a truly demand driven (and thus competitive) public procurement programme can kick-start the growth of a competitive group of small producers.

On the supply side, regional and central government intervention have been influential in a number of industrial clusters and networks through the development of sector specific producer service institutions. Examples of these include: the SENAI vocational schools in the Sinos Valley which provides skilling and training facilities; the Apparel Export Promotion Council in Tiruppur which facilitates trade fairs and export visits by Tiruppur's small garment manufacturers; and, the various sector specific as well as general training and support institutions operating in Bangalore which have facilitated the technical development of many of the city's leading knowledge intensive industries. These local institutions, either constituted by regional or central authorities, with active participation of SMEs and their respective trade and community bodies have been influential in easing many of the key constraints that small producers face.

What one concludes from this broad brush overview is that the role for government intervention is of great importance in providing targeted sectoral support, on technologies, training and market information; and that such programmes prosper where they are integrated with representative local bodies. Furthermore, the importance of such policy intervention is far from diminished in the current climate of liberalisation and the overall diminishing role of the State. In fact to capitalise on the opportunities being thrown up by these changes, strategic intervention by government is often necessary. As Levy (1994) points out "a liberalised private marketplace will not necessarily ensure industrial development. For many firms, subsectors and countries, well-functioning collective support systems for marketing and technology accelerate industrial success".

But then what kind of intervention is required? Levy's study shows clearly that it is private forces that largely account for the development of SMEs. However, the government can play an important part as an enabler and facilitator that makes it possible for such private agencies and inter-relations to come into operation. One area where state support was considered to be of great importance in ensuring sustained competitiveness of the clusters and networks reviewed in this paper was infrastructure development. In most cases the leading constraints identified by cluster based SMEs were not a lack of capital, but a lack of electrical power, poor roads, transport facilities, telephones and water. Collective action by SMEs can lead to improved infrastructural development. However, in many of these areas SMEs and large

firms clearly felt that the level of investment and the nature of the problem required public intervention.

The case material indicates both the limits to, and the potential for, joint action and policy support in SME industrial clusters and networks. It suggests that instead of pursuing the current fashion of credit extension as the main strand of SME support programmes, greater effort has to be placed on improving collective resources, such as infrastructure, and in developing targeted sectoral support programmes in conjunction with local institutions and trade bodies. It is also apparent from these cases studies that intervention strategies need to be aware that large firms and external agents (foreign buyers and often TNCs) are critical players in determining the trajectory of growth that SMEs within clusters and networks will follow. What this underlines is that with increasing trade liberalisation SMEs are very much a part of global technology and commodity chains where the strings are often pulled by large firms and foreign buyers. In such chains, the prospects for SMEs to obtain a better deal, and to technically grow, are enhanced when they are collectively organised within sectoral clusters or industrial networks.

There are a number of policy questions that remain unanswered. One of the most important grey areas is understanding how the macro policy framework, of trade regimes and fiscal policies, has influenced the growth of SMEs in industrial clusters and networks. While the liberalisation strategies of today are of great importance, the protectionist programmes of yesterday may have been of some significance in allowing SMEs to prepare themselves for global competition. This requires linking the macro with a meso level understanding.

To conclude: what this review underlines is that small firms as parts of clusters and networks can succeed, not on the crutches of subsidies but in fair market environments. They can generate employment, raise incomes and technically advance. To achieve these objectives they need some targeted support from public agencies, using what Levy (1994) aptly terms as “a light touch”. There are no universal blueprints for SME development programmes, Rightly so as each experience is contextual and heterogeneous. Nevertheless, for policy makers and support agents to attempt at achieving what Humphrey and Schmitz (1995) call the “Triple C”; that is intervention that is “customer oriented, collective and cumulative”, some policy lessons emerge from the reading of the success stories of Southern small producers operating within industrial clusters and industrial networks. These are presented below as an “Eight Point Programme & Policy Checklist” for facilitating the competitive growth of SMEs in clusters and networks.

**“Eight Point Programme & Policy Checklist for Supporting  
SMEs in Industrial Clusters and Networks**

1. Identify existing clusters and networks of SMEs, however nascent. Such forms of production organisation generate significant economies for small producers, encourage backward and forward linkages and raise prospects for collective action. Attempting to set up clusters and networks by administrative fiat, it should be noted, rarely succeed.
2. Policy must concentrate on groups of producers and not individual small firms. Furthermore, intervention needs to be targeted, sector specific and strategic. Generalist support programmes tend to have limited impact.
3. Focus on demand led product markets and the imperatives that they engender: namely achieving competitiveness on the basis of quality consciousness, fashion sensitivity, reliability, rapid delivery and not price alone.
4. Concentrate on institutions and instruments that facilitate the inter-face between producers and the market, such as trade fairs, export visits and external buyers, for accessing marketing information, product development, fashion trends and for acquiring technical know-how.
5. Support local and sectoral institutions that provide producer services such as technical training, technology support and market information. Use local levels of government for such support intervention and collaborate closely with representative business organisations and local self-help institutions.
6. Use large firms as important agents of change by promoting supplier upgradation programmes, also as part of industrial restructuring strategies of large producers.
7. Work towards a macro-economic framework that provides for a levelled playing field and an incentive structure that allows SMEs to operate on fair terms.
8. Finally, do not smother. Intervention appears to be far more effective in cases where policy agents have acted as facilitators and enablers. This gives scope for private initiatives and entrepreneurial energies to come to the fore and to strengthen the development of clusters and networks.

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