Cluster, Value Chain and the Rise and Decline of Collective Action: The Case of the Tile Industry in Santa Catarina, Brazil

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Draft

August 2002

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Abstract

In the first half of the 1990s, local companies in the ceramic tile cluster in Santa Catarina, Brazil, organised a collective response to a profound crisis. By the late 1990s, collective action had achieved some of its goals, but the competitive position had not improved as expected by the companies. In order to create a competitive advantage, companies have since pursued individual strategies. Localised rivalry has grown, and collective action has all but disappeared. It is argued that this can to some extent be explained by a restructuring of the value chain which changes the logic of collective action.

Keywords:

Industrialization, Latin America, Brazil

This paper is an outcome of the research project "The Interaction of Global and Local Governance: Implications for Industrial Upgrading"

Project homepage: http://www.ids.ac.uk/ids/global/vw.html

Financial support from the Volkswagen Foundation and the Department for International Development is gratefully acknowledged

1 Introduction: Clusters and value chains

For several years now, the academic as well as the policy discussion on latecomer industrialisation has been passing through a phase of profound redefinition. The 1980s and 1990s have witnessed the demise of heavy-handed, government-driven, top-down, centralist approaches to the promotion of industrial development in latecomer countries. As part of the "Washington Consensus", it was suggested that government intervention did more damage than benefit, even in the successful newly industrialising countries of East Asia (World Bank 1993). Even though this argument has repeatedly been challenged,[1] it is probably fair to argue that in the course of the 1990s even those who saw industrial development in East Asia as a success story of developmental government started to have increasing doubts regarding the applicability of this approach in less-advanced countries.

The increasing scepticism regarding the effectiveness of centralised government intervention and traditional industrial policy was one of the reasons why industrial clusters and cluster promotion received increasing attention, not only among donor agencies and governments in developing countries but also among enterprise promotion agencies in industrialised countries. Clusters, commonly defined as concentrations of firms of a given sub-branch of industry plus supporting industrial and service firms within a delimited region, started to become prominent in the discussion on industrial promotion in the 1980s, initially based on the striking growth and export performance of Italian industrial districts, mostly populated by small and medium-sized enterprises / SME (Piore and Sabel 1984, Pyke, Becattini and Sengenberger 1990). As clusters are frequent in developing countries, and the private sector there mostly consists of SME, promoting clusters appeared as a promising new approach to stimulate latecomer industrialisation (Schmitz 1989). Clusters promised to reduce all sorts of barriers – barriers to intra-firm competence building, as firms could specialise more; barriers to exports, as local firms could work jointly in export consortia; barriers to upgrading, since an agglomeration of many firms of the same branch created strong demand for business development services.

Firms in clusters which operated individually did already enjoy all sorts of advantages (e.g. the availability of specialised, experienced workers), but firms in clusters which managed to

1 See, for instance, Killick (1994) and the April 1994 special issue of World Development.

act collectively had a chance to create a competitive advantage beyond this. Building on the concept of “collective efficiency” introduced by Schmitz (1995), Nadvi (1999, 1608) has elaborated on this:

> "Collective efficiency is defined as having two aspects to it: external economies that clustered agents accrue by virtue of their location, and joint action benefits that arise from deliberate cooperation between local agents. I view external economies as the 'passive' dimension of collective efficiency. The term passive describes the nature of ties required between local agents in order to obtain externality gains. In contrast, joint action is the 'active' dimension of collective efficiency requiring deliberate and active cooperation. These two aspects can also be clearly linked; joint action by some agents can generate cluster-specific externality gains for others. This process of upgrading by facilitating the flow of technical information on standards and by assisting in managerial training. Local institutions can also play a potentially key function in defining and regulating local product standards, and thus in creating a reputational basis for the cluster's products. This provides a powerful example of what I refer to as 'externalities of joint action'".

Collective efficiency is not just a microeconomic issue but also involves a governance dimension. Passive advantages (easy access to suppliers, buyers and specialised workers) are based on market governance. It is the invisible hand of the market which is creating these advantages without deliberate collective action or government intervention. Active advantages may be based on hierarchical governance, if it is government which supports businesses’ efforts. More often, they will be based on network governance, if there is close interaction between government and non-governmental actors and joint upgrading efforts are based on negotiation and shared commitments. Enright and Ffowcs-Williams (2000, 4) summarise the rationale of cluster promotion as follows:

> “Membership of clusters and networks can enhance the productivity, rate of innovation and competitive performance of firms. Clusters and networks can allow small firms to combine advantages of small scale with various of the benefits of large scale. Public policy on clusters and networks can help SMEs realise the opportunities and meet the challenges associated with globalisation. Essentially, a policy on clusters provides a framework for dialogue and co-operation between firms, the public sector (particularly at local and regional levels of government) and non-governmental organisations. This dialogue can lead to efficiency-enhancing collaboration amongst firms, such as in joint marketing initiatives, the creation of mutual credit guarantee associations, joint design and sponsorship of training, a more efficient division of labour among enterprises, etc. Such a dialogue can also lead to an improved quality of policy and government

> action (such as in training, the provision of information, and infrastructure supply)."

Some case studies on clusters in developing countries indicated that local governance, especially network governance, can contribute significantly to solving competitive challenges (Schmitz 1995, Nadvi 1997, Meyer-Stamer 1998). This was not necessarily surprising as one might have expected that local actors would respond more swiftly, and in a more targeted way, to new challenges than a distant, less informed central government ever could. Moreover, a stronger local economic development effort fits into the larger picture of decentralisation.

Over time, however, increasingly evidence surfaced which lead to a questioning of the prevailing view of clusters as favourable places for SMEs to become internationally competitive, and in particular as favourable places for collective efforts to create competitive advantage. Most relevant are two types of evidence: on structural change in clusters, and with respect to the interaction between clusters and the economy at large.

Regarding structural change inside clusters, it was first and foremost ongoing observation of industrial districts in Italy which lead to the discovery of different trajectories in the evolution of clusters. In the 1990s, it has been found that concentration processes occurred in many of them, and that some others began to de-verticalize, i.e. to relocate certain activities to other locations (Brusco et al. 1996, 28 f., Ottati 1996, 45 ff., Crestanello 1996, 72 ff.). In Emilia-Romagna, a case study of four industrial districts found that 55.2 % of firms and 89.9 % percent of workers belonged to economic groups, a finding which indicates that the prevalence of SME is a feature of the past (Brioschi, Brioschi and Cainelli 2001). Some industrial districts managed to adjust to increasing competitive pressure, whereas others started to decline (Belussi 1999). Government efforts to promote the competitiveness of clusters have become less effective, as the demands of firms are increasingly differentiated, specialised and sophisticated, whereas public support institutions are increasingly bureaucratised (Whitford 2001).

Regarding interaction between clusters and the economy at large, some authors have early on criticised the analysts of industrial districts for their excessive focus at the local and the neglect of global economic issues (e.g. Amin and Thrift 1994). In the course of increasingly deep investigation of clusters, notably in developing countries, it became obvious how important the interaction with the global economy actually is – sometimes in terms of stimulating massive local upgrading efforts, such as in the case of the surgical instruments cluster in Sialkot, Pakistan (Nadvi 1999), sometimes in terms of creating obstacles to local

collective upgrading efforts, such as in the case of the footwear cluster in Sinos Valley, Brazil (Schmitz 1998).

These kinds of observations led some cluster researchers to have a closer look at one specific feature of international trade: the existence of value chains, and in particular global value chains. Research on this phenomenon, under the heading of "global commodity chains" (GCC), has been pioneered by Gereffi and others (Gereffi 1996). The work of Gereffi is mostly based on the investigation of production networks in the garment industry and trade, and even though he introduces a distinction between buyer-driven commodity chains (e.g. in garments) and supplier-driven commodity chains (e.g. in cars), his own work is mostly on the buyer-driven apparel chain. Other authors have investigated buyer-driven chains in other industries, such as footwear (Schmitz and Knorringa 1999), horticulture (Dolan, Humphrey and Harris-Pascal 1999), coffee (Fitter and Kaplinsky 2001), and furniture (Kaplinsky and Morris, undated). The common feature of these industries is the dominating position of first-world buyers vis-à-vis producers in developing countries, which is due to a high degree of concentration among buyers in industrialised countries and relatively low barriers to entry for producers in developing countries.

Even though the focus of most of the recent research on value chains which involve producers from developing countries has been global value chains, there is no a priori reason why national value chains should be unimportant. This is the angle which we will emphasise in this paper. What is the use of the value chain concept for this study? First and foremost, it is the emphasis on factors which shape competitiveness and upgrading which are located outside local clusters. In the case of the ceramic tile industry it is tempting to choose the local cluster as the focus of research. But we will see that limiting the focus in this way would lead to an entirely inadequate understanding of competitive patterns and upgrading. It might lead to entirely unrealistic suggestions for collective action and government intervention to strengthen the competitiveness of the cluster.

In this paper we will show that local factors played the crucial role in shaping the evolution of the tile cluster in Santa Catarina. Until recently, a cluster-centred perspective rendered most of the insights necessary to understand the evolution of the industry and the dynamics of adjustment to competitive challenges. We look at this in Section 2. This, however, is no longer the case. Local factors continue to play a very important role. But in order to understand the competitive dynamics in the tile industry it is essential to analyse the restructuring of the tile value chain. This is the key message of Section 3. In Section 4, we try

to explain the decline in collective action which we observed in the cluster. In Section 5, we draw some general conclusions.

2 Upgrading in the Santa Catarina cluster, Phase I

In earlier research (Meyer-Stamer et al. 1996, Meyer-Stamer 1998) we have pointed at the ceramic tile cluster in Santa Catarina as a successful case of upgrading through effective local governance, lead by the private sector. It was a case that contrasted starkly with the experience of other clusters in the same region. The field research which led to those findings was conducted in March 1996. In subsequent field research, conducted in April 2000 and August 2001, we discovered a striking deterioration in collective action and a profound change in the competitive structure of the cluster and the industry.

The cluster in SC is geographically concentrated in the south-eastern part of the state, around the city of Criciúma. One further large and one medium-sized firm are located in the Greater Florianópolis region, about two-and-a-half hours away, and another medium-sized firm is located in the northern part of the state. According to the available statistics (which include only part of the output from other, semi-formal producers) the tile producers in SC account for about a third of production and two thirds of exports. The first firms in SC started operating in the 1950s. The first phase of evolution was between the 1950s and 1970s, when the first firms entered production and were learning the basic features of tile production. The second phase, in the 1970s and 1980s, was marked by expansion of production capacity in order to be able to satisfy a growing market (which is today the western world's largest market), regardless of product quality. The third phase began when the sector stumbled into a deep crisis in 1989. By 1991, sales had dropped by a third, one of the large firms filed for debtor protection, and other firms came close to following suit. The firms reacted by defining technological upgrading as the way out, opting for quality instead of quantity; collective action played an important role in this context. Accordingly, production in SC has increased only slightly in the 1990s, whereas total Brazilian production more than doubled between 1990 and 1999. Behind this is a profound change in the structure of the Brazilian tile industry.

There are three tile clusters in Brazil, one in Santa Catarina (SC), two in the state of São Paulo. The clusters in SC and in Mogi-Guaçu, São Paulo, were created in the import-substitution phase, and their expansion was facilitated with financial support of the National Development Bank, BNDES. The third cluster, located in Santa Gertrudes, São Paulo, has a

completely different history. It started as an informal sector operation and grew through the turbulent 1990s by producing cheap tiles for poor and lower middle-class households. The contrast between companies in SC and Santa Gertrudes could not be more striking: Here extremely organised, ISO 9000-certified operations, there small and medium-sized, family-owned, semi-formal operations. And yet both parties are involved in a fierce rivalry. Companies in SC are clearly dominating the high-end market in Brazil, but they find it difficult to survive by producing high-end tiles alone.

In order to understand what is going on here, let us have a brief look at the product structure of the tile industry. One easy way of segmenting it is to distinguish basic and fashion products. Basic tiles are, for instance, 20x20 or 30x30 cm white tiles. They are produced year-in, year-out. They are very cheap, and the profit margins are very thin, but they are produced in large batches which help amortise the very costly production equipment. Fashion tiles involves a variety of colours and surface effects, and a company may launch up to four collections per year. The production run of fashion tiles is often just two years, with prices dropping sharply in the second year. Production batches are small, a given batch being in production for a few days at best. Changing a production line from one size to another and from one design to another is tricky, and during the first hours of production after a change a large part of the output will usually be of inferior quality. In other words, even though fashion tiles sell at high prices, producing them involves a certain risk, and their contribution to companies' earnings may be lower than the high price suggests. This leads us back to the basic tiles: they may contribute only a small profit margin, but it is predictable and stable.

So companies in SC find it hard to outflank competitors in Santa Gertrudes by targeting the high-end fashion segment only. They have to compete head-on with companies in Santa Gertrudes by producing standard tiles. In order to establish a competitive advantage, they devised a variety of approaches in the early 1990s, all of which involved a certain degree of collective action:

- using technical standards as a competitive weapon,
- technological upgrading of the production process to increase productivity,
- getting access to a less costly source of energy,
- creating differentiated products.

2.1 Technical standards

Some of the tile producers in SC were among the pioneers of ISO 9000 certification in Brazil. In the course of the 1990s, most of the tile manufacturers in SC became ISO 9000 certified. However, this does not seem to establish a competitive advantage, either domestically or abroad, though it did render advantages in terms of the reorganisation and upgrading of the production process, leading to improved efficiency. Some firms are ISO 14 000 certified, or preparing for certification, and one of the large firms is preparing for BS 8800 certification, which is a standard for occupational health and safety. Again, this effort is part of the firm's philosophy of constant upgrading rather than reflecting an acute or imminent pressure from customers, but it does not establish a competitive advantage. In fact, companies explain that their expectations regarding the competitive impact of ISO 9000 and 14 000 certification have not been fulfilled, and some of them have decided not to renew the ISO 9000 certification.

Another standard which firms presented as being very important in 1996 is ISO 13 006 which defines the features of a tile. Firms in SC were keen to be certified, and to create an infrastructure for efficient certification, since they hoped that this might establish a decisive competitive advantage vis-à-vis their competitors from Santa Gertrudes. However, things did not quite work out that way, and this for two reasons. First, final customers did not pay that much attention to the certification and rather made their decisions according to design and price.

Second, some of the competitors from Santa Gertrudes also got their products certified. As firms from SC point out, products from Santa Gertrudes just barely stay within the limits established by the standard, but this detail does not make any difference in terms of customer perception. Representatives from some firms in SC are fantasising about stricter standards to keep Santa Gertrudes out of end product certification; this reflects their unwillingness to take their competitors seriously rather than it is a viable option, especially since standards such as ISO 13 006 are defined by industry bodies in Europe without any participation from Brazil.

2.2 Technological upgrading

Technological upgrading involves two distinct types of activities. One is to acquire new equipment. The other is to master equipment, in particular be developing the tacit knowledge which is essential in fine-tuning equipment and getting the most out of it.

Regarding the first point, in the tile industry everybody depends on Italian capital goods manufacturers, including firms in Spain (where the Castellón cluster has emerged as the most dynamic growth pole of the global tile industry). The capital goods producers are one of the two main technology drivers in the industry (the others being producers of glazing material; we will come to them in a moment). Their efforts are not just about improving the production process. Machine producers offering new options stimulate a substantial part of product innovation. In fact, product change in tiles is more rapid, and more fashion-prone, than one might expect, reflecting a circle which may be seen as virtuous as well as vicious, involving machine producers and tile producers (in particular in industrialised countries) which both see product innovation as the main competitive weapon against their respective competitors. Firms in Brazil report that access to latest vintage equipment is not restricted, though machine producers tend to collaborate with some Italian tile producers during the final phase of machine development. A representative of the machine producers' association confirmed that, to the dismay of Italian tile manufacturers, machinery is sold to whoever is able to pay.

The latter point is the much more acute bottleneck for firms from SC than access to production technology. From a financial perspective, most of the companies are in dire straits (Table 1). Tile production is a capital-intensive business, and therefore firms rely on credit to expand or modernise production facilities. At the same time, a sound business strategy in Brazil is to minimise, and preferably to avoid, any long-term credit. As the country is hovering from one macroeconomic crisis to the next, real interest rates are unpredictable, except for the fact that they never come down to single digit figures. In the two most recent major crises, the central bank raised the lead rate close to 50 %. As the companies' representatives point out, with an ironic undertone, the only business viable with such credit rates is drug traficking. So companies are facing a tough choice. Basically, their solution has been to constantly renegotiate their debt with the National Development Bank. Nevertheless, this solves their problems only partially, since they stay indebted and are occasionally in

Table 1: Leading ceramic tile producers in SC

Company	Locality	Net Turnover (Real$ th.)(99)	Gross Profit (99)	Net Assets (Real Th.)(99)	Cash Flow (Real$ th.)(99)	Employees (98)	Liability (Real$ th.)(99)
Cecrisa	Criciúma	203.325	74.260	141.380	3.560	1.435	135.392
Portobello	Tijucas	177.873	65.495	89.225	2.449	1.393	81.461
Eliane	Criciúma	141.092	18.200	11.707	5.351	1.827	8.871
Itagres	Tubarão	39.090	14.817	9.347	26	281	21.089
Ceusa	Urussanga	26.941	12.136	60.309	2.224	200	6.136
Icisa	Imbituba	19.619	886	6.935	9.267	452	5.636

Source: Gorini & Correa (1999); Balanço Anual da Gazeta Mercantil (1 US$ = 1,60 Real$)

arrears, with the latter creating obstacles in obtaining further credit, for instance for export financing. Moreover, the firms also tend to be in arrears with the public utilities, something that further increases their vulnerability. In any case, technological upgrading through constant acquisition of new machinery is no option.

What then is left is the option to improve what is there, i.e. to deepen the understanding of the production process and its mastery. There are two complementary approaches in enhancing the knowledge base, namely increasing the skills development effort and building up R&D facilities. In the case of SC, the knowledge-related effort involved three institutions:

- One of the large firms had its own technical school, operating at secondary level, the Colégio Maximilian Gaidzinski. It opened the school for students from other firms.

- The local university (UNESC) set up a course in ceramics technology in 1996 and another course in materials engineering in 1998. The course in ceramics technology leads to a certificate, but not to a formal graduation. It has been formulated in close cooperation with the firms, and there is a supervisory council with firm representatives specifically for this course which is tailor-made for the tile industry. The material engineering course leads to graduation, and it caters both to the tile industry and the plastics industry which has a relatively strong base in the region. Both courses seem to be running well, with companies competing to get their employees enrolled.

- A Center for Ceramics Technology (CTC) was founded as part of the SENAI system. It was modeled after ITC in Castellón, the leading applied technology development institute in the sector (for details see Meyer-Stamer, Maggi and Seibel 2001, 34 ff), and was supposed to offer testing and certification services to firms as well as conduct research projects with firms. One of the rationales of firms in demanding the foundation of the CTC was to achieve economies of scale in testing of inputs, and to have a local institution for technical certification of final products, thus saving time and money. The creation of the CTC was due to a strong lobbying effort of all the tile firms, which literally involved collective action since at one point the CEOs of all firms travelled to the state capital to organise support from the state government and the state-level federation of industries.

Even though each of these institutions is up and running, the effect is falling short of the expectations. This has to do with two conflicts which erupted or materialised in the creation of these offers.

First, there is the way CTC was organised. It is administrated by SENAI. SENAI is the main organisation in vocational training in Brazil, and it is administrated by the private sector, being part of the system of the state-level Federation of Industries. Yet it has a high degree of independence, and it is often perceived as a governmental institution by firms, a perception that reflects, among other things, the fact that SENAI schools are rarely run in a business-like manner. SENAI is financed via a levy paid by each industrial firm (1 % of the wage sum). But as formal employment is constantly decreasing, SENAI's income is decreasing as well, and therefore the organisation has been involved in efforts to secure survival for quite some time. In the case of SC, this took the shape of upgrading. SENAI is phasing out what used to be its main task, namely apprenticeship training, and is creating course offers for short- and long-term courses at secondary and tertiary level which it is selling to firms. Furthermore, SENAI is setting-up technology centers in each of the main clusters in SC, something that is even further away from its traditional mission. Managing these centers is pretty much based on learning-by-doing, and thus depends to a high degree on the individual characteristics of the director. Since it is not sure that a director of a SENAI school has frequently set his foot into a firm or worked there, it is a challenge for a director of a technology center to have a clear and updated notion of business management and the kind of demands a firm may have.

To make bad things worse, the CTC was not just run by SENAI but involved a partnership with the Materials Laboratory of the Federal University of Santa Catarina (UFSC) in Florianópolis. While the engineering departments of UFSC have an excellent record in quality of training, their record in terms of co-operation with the private sector is anything but. So the CTC ended up with a double directorship – a SENAI person with no industry background, and an UFSC professor with no industry background, either, but strong academic aspirations. So rather than emulating the experience of Castellón's ITC, the actors in the cluster managed to create exactly the opposite. Up to this day CTC suffers from lack of credibility with the firms. One element, which is not at all helpful, is the fact that there are hardly any full-time employees; even the director is a person on loan from UFSC who spends at best three days per week at CTC. Most of the researchers are postgraduate and doctoral students financed with postgraduate scholarships, and for their personal career perspectives it is essential to achieve academic excellence, rather than selling services to firms or helping them in solving their everyday problems. Accordingly, interaction between ITC researchers and firms is complicated; just one of the minor problems involved in technological development work is the fact that what a CTC researcher perceives as a prototype appears as a rough sketch of a possible idea to a firm person.

Second, there is the position of UNESC and its relationship with CTC. It is important to know that UNESC is a private university, deriving its income mainly from the fees paid by students, so that offering courses which are locally in high demand is essential for the economic viability of the university. The curriculum of the ceramics technology course had originally been developed by SENAI, only to be transferred to UNESC after the intervention of one of the main cluster actors. One needs little creativity to imagine the kind of feelings SENAI/CTC had for the university afterwards, and it is not surprising that the relationship has been somewhat cool ever since.

2.3 Energy

Process energy accounts for about 18 % of the total cost in tile production (Gorini and Correa 1999). The current generation of kilns is designed to work with gas. For companies in SC this meant that they had to rely on liquified gas which was transported by truck, thus creating a serious cost disadvantage vis-à-vis foreign competitors who are connected to natural gas pipelines.

When in the early 1990s Brazil's government announced that a pipeline would be built to create access to natural gas from Bolivia, the plan was to connect just the industrial heartland in the state of São Paulo. Due to the lobby effort of industry in SC, which was led by the tile industry, the state government created a public enterprise, SC Gás, to build a pipeline and deliver gas to industries in SC.

The tile firms were connected to the natural gas supply in 2000. But they are far from satisfied now. They were expecting that they would have to pay about the price their European colleagues are paying. But SC Gás linked its price to the Dollar/Real exchange rate, so that the price more than doubled between January 1999 and September 2001.

2.4 Differentiated products

While upgrading activities related to technical standards, technology and energy involved a combination of intra-firm effort and collective action, the creation of differentiated products was strictly an intra-firm activity. Around the mid-1990s, some of the companies, especially the large firms, started to set up in-house design teams. Some of the designers had been trained in Italy, and one of the companies emulated the earlier Italian practise, described by Russo (1985), of contracting prominent artists to create unique designs.

However, this approach had only just gone into implementation when the companies reversed their approach. For one thing, the effort to launch unique Brazilian designs, drawing on popular motives, was not received well by the market. But the main factor was a different one, namely a profound change in the relationship between tile manufacturers and producers of glazing materials.

In the course of the 1990s, producers of glazing materials have emerged as important technology drivers in the tile industry. Whereas Italian firms are the undisputed leaders in capital goods, Spanish firms have a very strong position among glaze producers, with their Italian competitors having dropped to a distant second place. The second half of the 1990s saw a profound change regarding the structure of the glaze business in Brazil. Until the early 1990s three TNC affiliates were producing glazing materials in Brazil (from Italy, Germany, and the U.S.). With the strengthening of the tile cluster in Castellón, Spain, and the growing competitiveness of producers of glazing materials (Meyer-Stamer, Maggi and Seibel 2001, 29 ff), Spanish glaze producers founded affiliates in Brazil, mostly in SC. Today, there are 27 glaze producers operating in Brazil, which is more than in Castellón; seven of them have manufacturing plants in the Criciúma region. Competition between them is intense. In order to create a competitive advantage, they changed their behaviour in a profound way. According to tile manufacturers, in the old days a glaze producer would come up with a new glazing variety, drop it at the porter's and leave it to the tile manufacturer to figure out what exactly to do with it. In the second half of the 1990s, the glaze producers have set up development and design teams, offering a full service to tile manufacturers – the design, the glazing material needed to produce it, and technical assistance in mastering new designs and solving problems in the production process. We found no indication that Brazilian tile manufacturers are discriminated vis-à-vis companies at the home base, in Castellón. It rather seems to be the other way around, i.e. Spanish glaze producers draw on know-how available at headquarters and at Spanish R&D centers if they cannot solve production problems locally.

In effect, tile producers in SC were offered high-quality designs, some of them by top European designers, for free. Even though the glaze producer may take a set of design proposals from one tile manufacturer to the next, there is usually an explicit or implicit exclusivity clause once a tile manufacturer goes for a given design and purchases the necessary inputs to produce it. So the tile producers gladly disbanded their in-house design teams and created collections based on designs they received for free from glaze producers.

3 Upgrading in the SC cluster, Phase II

Towards the end of the 1990s, the upgrading effort in the tile cluster in SC entered into a new phase. The initiatives described before had more or less achieved their goals, but this had failed to establish a sustained competitive advantage. In particular, the competition from Santa Gertrudes was becoming an increasingly serious threat. The standards-related approach to keep them out of the market had failed miserably, and now they also had access to designs provided for free by the same glaze producers. Moreover, some of them were awash in cash and spent heavily to acquire latest generation Italian machinery; some observers estimate that production in Santa Gertrudes grew tenfold in the course of the 1990s. Therefore, tile companies in SC had to come up with new ideas to establish a competitive advantage. They pursued two approaches: Launching new products and dealing with the downstream part of the value chain.

3.1 Products

The most significant tendency in product upgrading has been the set-up of plants to produce porcelain tiles; all the three biggest companies have gone for this. Porcelain tiles have been pioneered by Italian companies since the late 1980s. They can be made to have an appearance like marble or other natural stones. They are sold at higher prices than conventional tiles. One of the companies has been producing porcelain tiles since 1996; the other two have started production in 2001. However, it is doubtful to what this will really establish a competitive advantage. First, Italian producers are selling marble-like porcelain tiles at about half the price of real marble. In Brazil, there seems to be no price differential at all.

Second, there is the issue of mastery of the production process, which has repercussions on quality and efficiency. We had the opportunity to visit one of the porcelain tile factories. Some observations we made during this visit illustrate the technology-related issues of tile producers in SC:

1. A substantial part of the factory is very dusty. A substantial amount of the mass, which is the most costly input, escapes from the presses and gets blown around inside the factory. We did not observe this kind of phenomenon in European factories.

2. Related to this is the observation that losses along the production, due to loss of mass and breakage of biscuits (raw tiles before entering the kiln), amount to 6 % of the total input.

If we assume, conservatively, that inputs contribute one third to total cost, this loss means that 2 % of total cost is just wasted.

3. Next to the kiln a plate explains what is happening there. It indicates that inside the kiln temperature is supposed to be around 1220° centigrade. However, during a visit to the control panel we could observe that the maximum temperature at that moment was 1208°, and that at most sensors inside the kiln the temperature was below 1200°. Small differences in temperature can have a substantial impact on the appearance and physical characteristics of the product.

These observations indicate a lack of effort to improve the operation of the production line and to get the maximum yield and quality out of it. The problems we observed reinforce each other: Inadequate operation of presses is one of the important reasons for losses, and it is also an indicator that the overall control of the pressing process is inadequate. This, in turn, contributes to the high incidence of breakage at later stages. Moreover, lack of control at the early stages leads to variety of quality at the later stages, in particular inside the kiln. This is reinforced by the variation of temperature inside the kiln, which causes an even larger variety of quality, and a high incidence of second rate tiles which receive a much lower price.

A different approach to differentiated products relates to design. Some companies are rebuilding some of the structure their design departments used to have in the middle of the 1990s, when design was perceived as an important source of competitive advantage. They keep a small group of professionals to define a product portfolio identity, trying to differentiate themselves from the competition, since the strong outsourcing of product design, mainly to glazing producers, led to products which increasingly looked the same, independent of who produced them.

3.2 Restructuring the downstream parts of the value chain

In analysing customer complaints, firms realised that there is little sense in producing high-quality tiles if the tiler is not sufficiently competent to place them. There were constant complaints of final customers about tiles which, shortly after being set, started to break apart. Customers ascribed this to the supposedly poor quality of tiles. The true problem, however, was the poor quality of tiling. The most radical manner of dealing with this problem is consequent forward integration: producing not only tiles but also making sure that they get set in the correct way. There are three stages through which firms get to this point:

1. Firms start, at their own cost, to train tilers, organising courses both at their home location and elsewhere in the country. In some cases, this includes fitting the tiler with a box of tools.

2. Firms not only train but also certify tilers, and offer customers a 5 - 10 year warranty in case they employ the certified tiler to set the tiles using the firm's own *argamassa* and *rejunto*. This full package is especially offered by one of the large firms with own shops, so that the customer has only the shop to deal with, paying only one bill.

3. Firms start to train and employ their own tilers, offering the full package to construction companies. This is not only based on quality considerations but also on the observation that the cost of setting the tiles is higher than the cost of producing them, so that the full package opens up the opportunity to increase the margin.

However, this is only part of the restructuring of downstream activities which has started in the late 1990s. The first major activity, pursued not only by the large but also by some of the medium-sized companies, was the set-up of showrooms in major Brazilian cities. Potential customers can not only have a look at a given company’s product portfolio but also receive advice on how to fit tiles into the interior design of their home.

The next step was a profound change in the way tiles are being sold. Two of the large firms started to build exclusive franchising networks which cater for high-end customers. Inside the shops, well-trained salespeople are attending customers, and architects are offering, free of charge, design proposals, involving combinations of floor- and wall-tiles.

Regarding middle-class customers, firms assume that they are more likely to enter multi-product shops for construction material, a segment where a major change seems to be underway. Traditionally, the dominant pattern were small- and medium-sized, family-owned shops. In the recent years, some large foreign chains started to establish themselves in Brazil (Castorama and Le Roy Merlin from France) or are in the process of evaluating the market potential (Home Depot from the U.S.), and some domestic chains are being set up which follow the same pattern. It is a common expectation that the sales channel for construction material will experience a process of concentration, professionalisation and upgrading similar to the one which happened in the super- and hypermarket-segment, although the evidence in this respect so far is mixed. Large chains such as Wal-Mart already had to learn that they cannot simply transfer their model to Brazil, and it is possible that the necessity to adapt is even larger in construction products. Tile companies are carefully observing the changes occurring, both in the domestic market and in key foreign markets. With their propensity to

set up franchise systems for the high-end, they have already indicated that they are not going to passive observers of changes in the medium segment of the tiles trade.

Altogether, the focus of the companies has changed quite profoundly. They assume, not necessarily correctly, that productivity and quality issues have been solved. In their view, the time for collective action to solve product certification and production issues has gone. The emphasis now is on downstream activities, i.e. complete service and distribution and sales. Differentiation at this stage is now supposed to create the decisive competitive advantage.

4 Upgrading and the rise and decline of collective action

Strong collective action was at the core of the upgrading strategy of the cluster in the first half of the 1990s. It aimed at solving acute problems:

- Tests and certification of product and process standards, to be done by the CTC, in order to squeeze competitors out of the market,
- Higher education courses, to be created at the local university, in order to create a knowledge base which would permit a deepened understanding of the production process,
- The provision of natural gas through an extension of the Bolivia-Brazil pipeline in order to reduce energy cost,
- Political lobbying to revive the construction sector in order to raise demand (Meyer-Stamer 1998; this effort did not get anywhere).

The deterioration of collective action which was observable in the late 1990s can be traced back to several factors:

- First and foremost, many players in the cluster find that the collective initiatives of the early 1990s have either achieved their objectives or have proven to be fruitless (political lobbying to revive the construction sector), so that there is no point in continuing collective action. New challenges are emerging at the marketing/sales/distribution stages, but this is a very competitive subject where companies are not ready to co-operate.
- Companies are convinced that the main technology and production problems have been solved (even though a benchmarking effort which we conducted did not confirm this

view; see Meyer-Stamer, Maggi and Seibel 2001, 42 ff). In any case, the typical responses to technological problems are in place: strong intra-firm effort (with ISO 9000 certification as an indicator), more training, a R&D institute.

- With respect to the management problems in CTC, it is important to note that creating a physical structure is simpler than managing the interface between university/academic research and applied technology. An open question is why the original role model, Castellon's ITC, has not been analysed in a more profound way. In any case, we found strong evidence that neither in the academic sector nor in the industry the management know-how is available which would be necessarily to turn the CTC into something remotely resembling the ITC. This leads us back to the point made before: There is no easy, straightforward, convincing proposal for collective action to remedy this problem, at least not remotely as straightforward and convincing as the proposal to create the CTC was ten years ago.

- In the first half of the 1990s, the employers' association, Sindiceram, broadened its scope of activities by organising seminars and playing a key role in organising the lobby effort. This was mostly due to elected officials exerting strong leadership. Individual leadership is highly important in associations with a low degree of professionalisation, such as Sindiceram, but it also makes their behaviour highly volatile. If new, less dedicated officials are elected, the performance of the association may deteriorate drastically, and precisely this seems to have happened in the second half of the 1990s, as a president came into office who never really aspired this position and was actually much more gifted in leading his firm than the association.

- Finally, there is the issue of party politics. In Brazil, *política partidiária* means not just party politics in the way it would in Europe. The connotation of the term outside the political system is strictly negative, as it describes a Machiavellian conceptualisation of politics, based on zero-sum games, where any initiative launched by Party A will face fierce resistance by Party Z for the simple reason of having been launched by that party, even if it is a meaningful initiative. Accordingly, a business association where key actors belong to competing parties is effectively paralysed. This seems to have been another problem affecting Sindiceram, as well as the local business chamber which played a constructive role in the early 1990s but ceased to do so later on.

Implicit in much of the cluster literature is the suggestion that, once it has been effectively organised and successfully implemented, collective action will develop a dynamic of its own

– solving problems, creating trust among the participants, thus creating the conditions for more, and more ambitious, collective action. The case presented here is at odds with this view. An obvious question would be: Does the decline in collective action reflect rational, utility-maximising behaviour, or is it rather a network failure which ought to be remedied, the sooner the better?

We would tend to argue that the erosion of collective action reflects rational, utility-maximising behaviour. At the beginning of this decade, two things were profoundly different from a decade ago. First, the benefits from easy options for collective action have mostly been reaped. Any economic actor who considers to get involved in collective action will assess the potential benefits and the costs and risks attached to them. The activities pursued collectively in the first half of the 1990s had a favourable cost/benefit ratio. In fact, the cost was very limited, whereas the promise of cost savings was very strong. In the current situation, there may still be some opportunities for collective action. When discussing with business leaders, we came across issues such as training of sales representatives and better control of the production process, particularly at the early stages (pressing of tile bodies). However, firms are hesitant when it comes to joint training of sales reps, as they fear that some critical knowledge might slip. Moreover, it might increase the risk of poaching of particularly talented sales reps. The issue of better control of the production process leads us back to the point that, first, the necessary training courses are essentially there and that, second, the issues around the interaction between companies and CTC will not be easily solved.

The second point which is profoundly different from a decade ago is the structure of the value chain. Ten years ago, glaze producers were producing glaze, and tile companies were designing and manufacturing tiles. Today, glaze producers are designing most of the tiles, and they are assisting tile companies in sorting out problems in the production process. Glaze producers have expanded their activities further down the value chain. The tile companies have been, by moving into services and sales, doing the same thing. The fact that tile companies' top technicians today are working in the sales department, not at the shop-floor, is just an indication of the changes which have occurred. The tile companies are not only training tilers and offering the full package of tile plus cement plus a certified tiler, but some of them are actually setting up their own sales chain.

The restructuring of the value chain has changed the logic of collective action in different respects.

- There is a different constellation of players involved in many of the potential fields of collective action, in particular those related to the production process. Any effort around process upgrading today would have to involve glaze producers' technicians as well. But the rivalry, and probably the mistrust, between glaze producers is even stronger than between tile companies.

- Among tile companies the fact that some of them are creating exclusive sales channels is creating a different constellation in terms of collective action. To some extent, it is a strategy which aims at establishing a decisive competitive advantage vis-à-vis competitors in Santa Gertrudes. But it is also targeted against local competitors

5 Conclusions

In an earlier article (Meyer-Stamer 1998) we argued that the tile cluster in SC established a rare case where actors within a cluster tried to activate cluster advantages, with explicit reference to the model of Italian and Spanish industrial districts, in order to create a competitive advantage. It is not without irony that more recently it emulated, unintentionally, the decline of collective action which we have also observed in the Italian tile cluster of Sassuolo (Meyer-Stamer, Maggi and Seibel 2001). It is no coincidence, however, that the reasons for declining collective action are in both cases related to a restructuring of the value chain, in particular the increasing attention tile companies pay to downstream activities.

In the introductory section, we argued that it is useful to combine a cluster and a value chain perspective to get a better understanding of upgrading perspectives, in particular those involving collective action, within a given cluster. In the case of the SC cluster, two chain-related issues interact in creating a constellation which militates against collective action within the cluster. One is the changing role of glaze producers, which manufacture a key input for tile companies and which, as the result of a fierce struggle among rivals, are taking over activities which until recently where undisputedly part of the operations of tile companies. The other is the effort of tile companies to move into downstream activities, which culminates in their moving into tiling and sales operations.

It is notable that we did not refer to international value chains. The leading firms in the SC cluster are integrated into international value chains, but this is not the element which is shaping their competitive strategy. Their effort to control the evolution of the national tile value chain is more relevant for understanding their behaviour than the analysis of their

foreign sales activities (for details see Meyer-Stamer, Maggi and Seibel 2001, 48 f). The emerging literature on value chains and developing countries suggests that it is global value chains which count. Our case shows that this is not necessarily the case. At least for developing countries with relatively big domestic markets, domestic value chains may be more relevant; the Brazilian tile market is the second largest in the world, after China, but ahead of Spain and Italy.

Our case study also illustrates that their are more types of value chains than supplier-driven and buyer-driven chains, as suggested by Gereffi (1996). The Brazilian tile value chain, just like that involving Italian and Spanish manufacturers (Meyer-Stamer, Maggi and Seibel 2001), does not display a clear power structure. In fact, a variety of players are struggling to attain a dominating position – producers of inputs, tile companies, sales chains. But at least so far it appears unlikely that any one will succeed.

Our case study underlines the argument that neglecting the insertion of a given cluster into value chains can lead to skewed conclusions regarding a cluster strategy (Humphey and Schmitz 2000). In the case of SC, a pure cluster perspective would tend to mourn the decline of collective action, and in terms of policy conclusions it would support the idea of trying to revive collective action. Taking into account the evolution of the value chain, things appear in a different light. The factors within the cluster which militate against collective action may appear surmountable. But if one includes the chain-related factors, the suggestion to go for renewed collective action become much less convincing.

The case of the tile cluster in SC teaches thus some important lessons regarding cluster promotion as a means of facilitating industrial upgrading. First, activating cluster advantages in practice is much more difficult than it may appear. It involves a multitude of management issues, and the management skills which are crucial (e.g. running a technology centre and managing the interface with companies) do not necessary exist in the cluster nor can easily be mobilised elsewhere. Second, stakeholders in a cluster tend to appraise the costs and benefits involved in cluster initiatives and collective action, and if they find that the benefits do not clearly outweigh the costs they may decide to discontinue their involvement in collective action. It is by no means the case that successful collective action leads to more collective action. Third, restructuring of the value chain may have important repercussions on the options for collective action in a given cluster, in particular by increasing the costs and risks involved in collective action.

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