ORGANIZATIONAL FORMS, TECHNOLOGICAL AND COMPETITIVE STRATEGIES IN PARANÁ FURNITURE INDUSTRY

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Abstract

Technological innovations in the industry of wood pieces of furniture are related to process, new products, new materials, design development, technological innovation of production means and management. There is a strong tendency in the organization of the companies, mainly inside the clusters, towards specialization of the firms. The furniture pole selected for study, Arapongas, is specialized in linear pieces of furniture. The objective of the paper is to understand the dynamics of the furniture industry in Arapongas, one of the six largest poles in Brazil. Data collected with owner/managers of ten small and medium-sized firms allowed for the identification of technological and competitive strategies. These data formed the basis for an analysis of the potential formation of a cluster of companies in this region. The paper is structured in four sections. The first introduces the discussion. The next one presents the idea of industrial cluster and its main characteristics. The following section explore the data obtained during interviews with 10 entrepreneurs running small and medium-sized furniture manufacturing firms. The final section concludes with an analysis of the possibilities and limitations related to a potential formation of a furniture industrial cluster in Arapongas, an organizational form that brings many competitive advantages for an economic region.

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INTRODUCTION

The furniture industry is a traditional industry, with a consolidated and widely spread production technology. Its pattern of technological development is externally determined by the capital goods industry (Paschal apud Marion Filho & Bacha, 1998, p.123). According to Gorine (1998), the commercial opening and growing globalization have been inducing Brazilian firms of the furniture sector to mature, to accomplish cooperation and to modernize, intensifying competition and stimulating the managerial capacity of adaptation. Production levels and export trade have been growing, indicating the sector potential.

Cooperation among firms can happen in a reasonable number of different formats. For instance, Amato (2000) explains that this phenomenon can range from highly informal structures to tightly formalized institutions, including strategic alliances, firms networks, industrial clusters, virtual organizations and incubators. The same author explains that cooperative strategies emerge due to several reasons, such as, competence and know-how sharing, risk reduction in R&D, strengthening of buying and negotiation powers with suppliers, and search for higher quality products and services (Amato, 2000).

Cooperative strategies firms have been debated quite extensively in the most recent literature (Camarinha-Matos, Afsarmanesh & Rabelo, 2001; Humphrey & Schmitz, 1998; Pyke, 1992; Pyke & Sengenberger, 1992). In the context of small firms, cooperative strategies seem to be essential, possibly leading in the long term to a formation of a cluster of firms. However, a prior step that has to be made is the formation of an entrepreneurial network that has been defined as relationships or alliances which individuals develop with others who may be influential in determining the degree to which an enterprise is likely to become and remain committed to innovation, development and growth (Carson et al, 1995).

This paper presents the results of a research project that investigated the potential formation of a cluster of furniture manufacturing companies in a city located in the north of Paraná, Southern Brazil - Arapongas. Data collected with owner/managers of ten small and medium-sized firms located allowed for the identification of technological and competitive strategies. These data formed the basis for an analysis of the potential for a formation of a cluster of companies in this region. The paper is structured in three additional sections. The next one introduces the idea of industrial "cluster" and presents some of its main characteristics. The following section explore the data obtained during interviews with 10 entrepreneurs running small and medium-sized furniture manufacturing firms. The final section concludes with an analysis of the possibilities and limitations related to a potential formation of a furniture industrial cluster in Arapongas, an organizational form that brings many competitive advantages for an economic region.

CLUSTERS AND INDUSTRIAL COMPETITIVINESS

Globalization is a process with widespread consequences of diverse nature for humankind. In economic terms, the increase in competitiveness due to globalization has led to the search for new organizational forms such as networks and clusters. Recently, the literature has shown that these new forms of organization are marked by greater cooperation among companies in a certain economic sector (Amato, 1999), while, at the same time keeping up prior competitive pressures (Bradenburger & Nalebuff, 1998). This phenomenon has been studied recently specially in terms of implications for industrial policies formulation (Porter, 1998).

Morris and Brennan (2000), discussing the importance of an enabling environment for cooperation among firms, argue *that current models of regional development purport that regional economic development can be facilitated through the adoption of a "self-help", locally driven approach and emphasize the importance of establishing networks with cooperative relations between a region's key stakeholders* (p. 1). They refer, specially, to relationships among entrepreneurs and with local government agents and institutions.

According to Becattini and Rabelotti (apud Lins, 2000, p.235-236), clusters or industrial districts are geographical concentrations of firms specialized in a sector, usually composed of small and medium-sized companies, whose production tends to happen in a vertically disintegrated way, because the firms specialize in different parts of the productive process, where relationships between suppliers and customers among firms reinforce interfirms links, both forward and back in the productive chain, stimulating cooperative activities and competitiveness, by mercantile and non-mercantile links. The productive activities grow with the support of specialized services related to the commercialization in distant markets and of networks of public and private institutions.

Pyke (1992) discussing the concept of a cooperation system among firms highlights that it usually comprises a set of independent small firms, having a region for a base, belonging to the same industrial sector (including upstream and downstream activities), with a high specialization among firms in terms of productive process, that organized as a set use local institutions through competitive and cooperative relations.

Rabelotti (apud Lins, 2000) emphasizes the existence of static and dynamic external savings associated with a cluster. The static savings are linked to the cost reduction generated by the specific location, while dynamic savings are associated to training and accumulation of knowledge and derived savings of the proximity also exist in function of the smaller transaction costs, involving the dissemination of information and “face to face” contacts.

Amato (2000) arguments that the present competitive environment demands a great deal of attention from entrepreneurs towards flexibility gains and acquisition of technological and managerial capabilities, emphasizing the high level of importance attributed to interfirms and interinstitutional relationships.

The geographical and sectorial concentration – cluster - does not guarantee the existence of collective efficiency. The productive gathering does not necessarily result in synergic vectors, but it is a necessary condition so that the articulation between external savings and joint action favors the existence of synergic effects. They favor links among the firms of a vertical nature (suppliers and sub-contractors; buyers and traders), of a horizontal nature (joint publicity of products; collective purchases of inputs and common use of some equipment) and of a multilateral nature (public and private institutions reinforcing the public-private collaboration)(Lins, 2000, p.237). The analysis of clusters’ formation allows the study of small and medium-sized companies and it reinforces the innovation capacity through imitation, reinforcing inter-firms and inter-institutional links.

On the other hand, in certain industries the promotion of firms in clusters can contribute to the growth and the regional development, because it allows, through space concentration, that smaller firms overcome the difficulties inside the firm, derived of the small size, making possible the most efficient exploration of scale savings and elevating the innovative capacity of the firms (Lins, 2000).

FURNITURE INDUSTRY OF ARAPONGAS: A CASE STUDY

The furniture industry in Brazil is adapting to the new environment, open and competitive, but it still contrasts with the international pattern, concerning the incipient up-to-date technology diffusion and the great verticalization of the national production (Gorine, 1998). In the nineties, the industry invested in the renewal of the park of machines, imported, in its largest part, from Italy and Germany.

However, there are quite a few modern companies, according to Gorine (1998), usually related to international trade, and there is a predominance of an outdated technological level and low productivity. There are not many companies that have specialized in parts and components production for furniture pieces and the high verticalization of domestic production increases industrial costs. There is a high level of informality in the furniture sector, since entrance barriers are very weak, either by the technological side or by the investments requirements in some industry segments.

Table 1 shows the most important Brazilian furniture manufacturing poles and the main supply and demand characteristics . It can be verified that Arapongas is an important center in the employment generation, it is relatively diversified, with companies that produce pieces of linear furniture (bedroom suites, kitchen pieces and and racks), upholstered, tubular and office pieces and they serve the national market, with potential to act at the international market.

Table 1 - Main manufacturing poles in Brazil

POLE	STATE	FIRMS	EMPLOYEES	MAIN MARKETS
Ubá	Minas Gerais	153	3150	Minas Gerais, São Paulo, Rio de Janeiro e Bahia
Linhares and Colatina	Espírito Santo	130	3000	São Paulo, Espírito Santo e Bahia
Arapongas	Paraná	145	5500	All Brazilian states
Votuporanga	São Paulo	350	7000	All Brazilian states
Mirassol, Jaci, Bálsamo and Neves Paulista	São Paulo	80	3000	São Paulo, Minas Gerais, Rio de Janeiro, Paraná e Northeast Brazil
São Bento do Sul and Rio Negrinho	Santa Catarina	210	8500	International market, Paraná, Santa Catarina e São Paulo
Bento Gonçalves	Rio Grande do Sul	130	7500	All Brazilian states and international market

Source: Gorine (1998)

The competitiveness of the Brazilian furniture industry can be enlarged significantly in the next years in function of the adoption of new technologies (import of machines with zero tariffs), differentiated design and financial and strategic support for the smaller companies.

In 1999, the participation of Paraná in the exports of furniture pieces reached 8%, while Santa Catarina with 50% and Rio Grande do Sul with 30% dominated the international trade. Paraná participated with 12.6% of the revenue in the industry and Arapongas participated with 7% in the total revenue. The pole of Arapongas is among the three of larger potentiality concerning revenues, together with Bento Gonçalves (RS) and São Bento do Sul (SC).

Arapongas is placed in the North of Paraná. Its population is close to 82 thousand inhabitants, it possesses good highway integration, and is located close to the best regional centers. There are 145 furniture manufacturing companies installed in the municipal district, generating 5 thousand direct jobs, that moved R$ 450 million on average a year in the period 1997/1999. Of the pieces of furniture produced in Arapongas, 95% are marketed at the internal market, in function of the low cost of the products, that are adjusted to the Brazilian reality. 5% of the total production is destined to the export market - 3% for Mercosul and 2% for Canada, Europe, Asia and Africa. Today, the furniture industry in the North of Paraná, represents 7.4% of the national revenue of the sector.

Furniture industry productive resources

Managerial culture is the dynamizing element of competitiveness, the entrepreneur adopts innovations inside the company, qualifying it with new technologies. In Arapongas, there is a favorable managerial atmosphere to the absorption of innovations, because the firms are endowed with wide vision on tendencies of the market, technical and technological transformations that happen in the sector, and of the varieties of options to cover the wood panels used in the production of pieces of furniture, for residential or office use. The exchange of information among the entrepreneurs is common, contributing to the knowledge accumulation on market, customers and suppliers. Every week, and average of 20 entrepreneurs of the sector get together to exchange information on the sector.

Among the surveyed companies, 70% were founded more than 10 years ago. The gathering of those companies in the region was motivated by the creation of a local industrial park in the beginning of the seventies. The furniture tradition was impelled by the growth of the size of the small companies, that were transferred to the park and of small scale furniture artisans that started the production of pieces of furniture in a larger scale. 100% of the capital form firms creation came from the local economy, that is, of the own state. The furniture manufacturing firms in Brazil usually are family businesses, that have grown in the past following a policy of profit investment.

The study is composed by companies with a number of employees that ranged from 9 to 170, altogether the 10 companies hired 885 people. The average number of employees was 88. The production involves 727 employees (82%), 150 people are responsible for the managerial work (17%) and there are only 9 employees in project development (1%). In the 4 smaller companies, there is no recruiting for the development of projects and R&D. Educational levels are quite low: 61% of employees did not complete secondary school, 36% finished secondary school, and only 3% presented a university degree.

In Arapongas, most of the companies produces linear pieces of furniture, they use wood panels in the production, with reduction of stages in the productive process as observed in the production of pieces of furniture of solid wood. The companies tend to diversify the production when they increase size, demanding larger administrative control of the established relationships with suppliers, employees and customers due to the needs of purchase of more inputs, larger control in the productive process and larger amount and diversity of the sales. Personnel's employment in project and R&D grows with the size of the company.

The companies showed a structured administration, decentralized, with distribution of functions among the employees with higher levels of education and qualification when compared to the average of other places. More than 50% of the principal equipment came from state of Paraná, followed by Southern states of Santa Catarina and Rio Grande do Sul, of other areas of Brazil, such as the state of São Paulo, main producing and supplying centers of capital goods for the furniture industry. It is significant the presence of imported machinery among the larger companies, being an important form of internalizing innovations and winning competitiveness.

Only the largest companies possess updated and partially updated equipment, the great majority recognizes that they work partially with outdated technology. The smaller firms use outdated equipment. The relative proximity of the raw material source for the furniture industry of Arapongas stands out as a locational advantage. The region is characterized by the production of pieces of furniture of wood panels, such as agglomerate, MDF, compensated, etc. In Arapongas, 117 companies use MDF in the production of pieces of furniture, of these, 50% use it in 100% of the production (March/2000). Other advantages are the good highway infrastructure, facilitating the distribution of products for the internal and external markets, good geographical position and the proximity with the countries of Mercosul (a potential market) and to Londrina, Maringá and Curitiba (390 Km) for the supply of any lack of the productive chain, such as technical, commercial, managerial and design consulting companies. A disadvantage that has to be mentioned was the existence of the workers' union in the construction and furniture industries at Arapongas, according to local entrepreneurs.

Technological management

In Arapongas, only the company with less than nineteen employees do not use any technical norm. All the others are users of some norms. One of them has got the International Standard Organization (ISO) 9000 series certification, and all the others are in the process of united implantation of that technical norm in partnership with SENAI/CETMAM. SIMA - Union of the Furniture Manufacturing Companies of Arapongas - in partnership with SENAI/CETMAM - Center of Technology of the Wood and of the Furniture - is training a pool of companies (22) in a enterprise management program that includes training, technical and technological assistance with a total quality focus. This is the SALPA project (Selection, Ordering, Cleaning, Standardization and Self control), a Brazilian version of the 5S developed by CETMAM, whose main objective is the formation of a solid base for the implantation of the ISO 9000 series for the furniture industry. All the companies use some kind of managerial technique. There is the prevalence of such techniques as: multifunctionality, 5S and statistical control of processes.

Strategies of the furniture manufacturing companies of Arapongas

Consumers' larger demands, the search for an increased competitiveness and elevation of the costs of the basic inputs (65.2%) were the motivating challenges of the furniture manufacturing companies' strategies. The elevation of the costs of the basic inputs was larger for the companies with more than 50 employees. The fixed costs of those companies are high and the vertical integration of the production is a strategy to guarantee more competitive prices of the raw materials through the purchase of larger lots of the suppliers and elimination of intermediary traders. Another strategy was to increase competitiveness through differentiation of the products, using an exclusive type of finish accomplished in the piece of furniture as the technology used in the production.

Institutional atmosphere and technological innovation

The cooperative projects between the companies and the Union of the Furniture Manufacturing Companies of Arapongas (SIMA), and of SIMA in cooperation with SENAI and other institutional collaborators such as the Municipal City hall, Environmental Institute of Paraná (IAP), Paraná Technical Attendance and Rural Extension Enterprise (EMATER), Center of Technology of Paraná (CITPAR), are the main examples of a cooperation strategy.

There is a partnership of the Union of the Furniture Manufacturing Companies of Arapongas with SENAI/CETMAM in the training development, technical and technological assistance for the local and regional furniture industry. All the companies participate in SIMA, and those with more than 19 employees also use the services of national consulting companies and SENAI (61.9%) for solution of problems of technical and technological order. Companies with more than 100 employees look for SEBRAE to solve problems of administrative order and training needs of the work force in the area.

All the researched companies use the same sources of technological information: specialized magazines and fairs are the most important ones. The interviews showed that the entrepreneurs' current concern with the need to directly research consumers needs. It is worth to point out that more than half of the replies referring the use of own research by the companies as source of information does not constitute the observed reality of the region. Two important fairs take place in bi-annual periods in Arapongas. The most important, FIQ - International Fair of the Quality in Machines, Raw materials and Accessories for the Furniture Industry. The entrepreneurs meet exhibitors of equipment produced in Paraná, São Paulo, Santa Catarina, Rio Grande do Sul, Italy, Germany and other countries, representatives of the most advanced technologies for the sector, being an important source of information for the development of the local industry.

Development of new products

The needs, preferences and tastes of the consumer of furniture pieces are influenced by the culture, habits and life conditions of modern man and by the design developed in products of other sectors, with different utilities and functions compared with the piece of furniture.

The development of new products in the furniture industry follows international tendencies. Entrepreneurs of the sector try to visit the fair of Arapongas and other international and national fairs, completing the process with consultations in specialized magazines, customers' demands of the internal or external markets, contracting specialists or by their own designers' ideas. The development of products "in the company" and "adapted in the company" correspond to 62.5% of the practices in the release of new models and product, while 12% of the products are developed by contracted specialists, as shown in table 2. The disseminated practice of copy of products was verified among the local companies, importing the culture of other countries. According to the company size, it was verified that this practice is also common in larger companies, but there is, also, a tendency of the larger companies in recruiting specialists in this area.

Table 2 – Development of new products and models according to firm size (%)

Number of employees	"In the company"	"Adapted in the company"	Consumers' demands	Hired specialists
Up to 19	25	25	25	25
20 to 49	17	33	17	33
50 to 99	40	20	20	20
100 or more	50	12	25	13
TOTAL	34	22	22	22

Source: field research, 2000

Relationship among furniture manufacturing companies

The entrepreneurs were asked about the company's intention in associating to other companies to act at other markets. The companies of the sector in Arapongas are verticalized, possessing all (or almost all) stages of the productive process inside of a same plant. Only three companies possesses interest in developing an associative work with other companies. The main reason for that, according to the respondents, is that due to the family nature of the business, they would not like to see their functions of manufacturers to be reduced to one of suppliers. Consequently there is no local predisposition for the division of the work among the companies. This is a procedure different from those observed in more advanced clusters.

The strong competition inside the sector limits the invigoration of the local community's base, either by the reinforcement of the representative institutions or by the formation of a system of local values. Nevertheless, the local sector possesses its own institutional arrangements, comparable to those of advanced clusters, such as the Centre of Purchases of Arapongas (CECOMAR). This aggregation of the entrepreneurs, however, does not alleviate the asymmetry of the relationships with the suppliers. Another institutional arrangement indicating a cluster formation is the Cooperative of the Exporters of Furniture Products of Arapongas (COOEXPORT).

Relationship with suppliers

The furniture industry of Arapongas is relatively close to the source of the main raw material. The acquisitions of panels of wood coming from Paraná correspond to 53.84% of the total among the researched companies. Other regions of Brazil contribute with 30.77% of the total, mainly São Paulo and Minas Gerais. This is due to the concentration of agglomerate and MDF production in the state of Paraná and São Paulo. The principal representatives of the production of MDF in Brazil are the companies Duratex in the state of São Paulo and Tafisa in Paraná. The production of agglomerates is represented by companies as Bernek, Plates of Paraná in Paraná and Eucatex and Duratex in the state of São Paulo (BNDES, 1997).

Companies with more than 50 employees showed a tendency to increase the acquisitions of raw material from suppliers of other states, and from abroad. Although being relatively close to the source of the main raw material, the local industry is confronted with suppliers with strong market force in this segment. The industry in Arapongas suffers with the pressure of the prices and the relative shortage of these raw materials, mainly the MDF.

The suppliers of foils distribute the product by quotas and they practice high prices. Given the importance of the relative proximity of the suppliers of panels and the oligopoly verified in the market of those raw materials, there are other fundamental factors, such as the agglomeration savings that can be generated with the grouping of companies, strengthening a set of small and medium-sized firms (ROSA, 1999, p.78).

Among SIMA projects, SIMFLOR - Auto Sustainability of Raw Material for the Furniture Pole of the North of Paraná stands out. The partnership with EMATER, Municipal City hall and IAP seeks the raw material production with the objective of strengthening the competitiveness of the sector. This project is related to the plantation of pine trees 150 Km far from Arapongas to supply, in the period of 15 years, wood for the furniture pole.

The criteria adopted by the entrepreneurs in the selection of suppliers are predominantly quality and period of delivery. Price, trust, payment conditions and services are of secondary importance.

Relationship with the Market

The pieces of furniture can be classified, based in the product lines, as kitchen suites, living room, bedrooms, pieces of furniture for bathroom etc. The Degree of Diversification of the production, defined as the relationship among (revenue with the main product/total revenue) x 100, was used as indicator of the concentration of the production in the main product. It was observed that in 57% of the researched companies the diversification degree is not over 50% of the total revenue with the main product.

Diversification of production is a common feature among the companies with more than 20 employees. It can be verified in companies producing furniture using panels of wood in Arapongas the production of several products, whose concentration in the main product does not exceed 70%. Thus, it can be inferred that the productive resources of that industry allows for this diversification degree, because there is a relative productive flexibility of the equipment in using many combinations of panels and coatings, obtaining thus a variety of products. The sector is endowed, therefore, with a great potential for innovation.

The production of pieces of furniture of middle market level is predominant (58%), while the production of popular pieces of furniture corresponds to 28.57% of the production of the researched companies. Among the companies with more than 50 people, the production is divided between popular pieces of furniture and of medium market level. The larger part of companies aim at the national market, but they already began to export a small portion of the production, the surplus of the production, mainly to the countries of Mercosul. Nine of the companies began looking for training to facilitate the entrance to the external market, mainly trying to differentiate their products through investments in quality, modernization of equipment and releases of new products.

POSSIBILITIES AND LIMITATIONS FOR THE FORMATION OF A FURNITURE INDUSTRY CLUSTER IN ARAPONGAS

The field research supplied the basis to analyze the possibilities and the limitations for the formation of an integrated industrial district of the furniture sector in Arapongas, comparing it with the Italian model of advanced cluster.

In Arapongas, the sector is specialized in the production of pieces of furniture of wood panels, it counts with several suppliers of basic inputs for the industry, such as representatives of coating materials for pieces of furniture, accessories, machines and equipment from Paraná and other places. On the other hand, there are few companies of management consulting, designers and of services of technical assistance. These services are requested from companies of other places, mainly of Curitiba (state capital), and more recently from SENAI (5 years). It counts with representative institutions of the interests of the sector, such as the union of the companies and other institutional arrangements like CECOMAR and COOEXPORT, proper of advanced clusters. There are exchanges of information between customers and companies, made possible, above all, by the circulation, at national level, of a magazine on the companies and the products that they manufacture, narrowing the relationship among them.

Cooperative actions addressed to the training and qualification of the labor force are made possible by the industrial atmosphere that surrounds and models the entrepreneurs' cultural values, of the workers and of the public institutions. Thus, the agglomerate of companies makes possible a larger synergy among the local economical actors because it allows exchanges of information and more frequent partnerships than the performance of companies isolated geographically.

Another characteristic of the sector is the great verticalization of the productive process of the companies, existing companies that manufacture products relatively the same without any division of the work among them. It deserves emphasis in Arapongas the existence of a specialized skilled labor force in the activities of the sector, with local formation of job market and professional qualification in specialized institutions (SENAI).

The characteristics of a typical cluster are compared to those of Arapongas in figure 1. A certain difference with the ideal is verified, but the evolution possibilities are high given the competitive advantages of the area.

Figure 1 Comparison of Arapongas with an advanced ideal cluster characteristics

IDEAL ADVANCED CLUSTER	**ARAPONGAS**
Agglomeration, with specialization in a determined sector of the productive chain, including backward and forward industrial sectors.	Agglomeration, with specialization in a determined sector of the productive chain, including a small number of backward and forward industrial sectors.
High degree of insertion of economic activities in the social, political and geographical environment	High degree of insertion of economic activities in the social, political and geographical environment
Work division among companies (Horizontal integration)	Vertical integration of production
Competition and cooperation	Competition prevails
Density in institutional relations	Density in institutional relations
Entrepreneurial capacity and a specialized workforce in activities related to the sector	Entrepreneurial capacity and a specialized workforce in activities related to the sector
Locational advantages greater than locational disadvantages	Locational advantages greater than locational disadvantages

Source: Rosa, 1999, p.90.

The pole of Arapongas possesses a high productive and export potential, but it does not reveal in the moment elements that allow the configuration of an advanced cluster in function of the verticalization of the production and of the absence of stronger associative links among the companies. This point is coherent with Amato (2000) that states that collective efficiency is due to interfirms processes and relationships, that is not obtained with geographical concentration alone. It can also be argued that in the case of Arapongas what may be lacking is a widespread behavior among entrepreneurs towards a construction of personal contact networks. This can be understood, in this case, as a incomplete transition towards trustful business relations, an essential feature of the present business world (Amato, 2000; Humphery & Schmitz, 1998)

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