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**GOVERNMENT SUPPORT FOR SMALL AND MEDIUM-SIZE  
ENTERPRISE'S CLUSTERS IN BRAZIL**

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Opinions and conclusions in this document are of exclusive responsibility of the author.

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## Introduction

The broad idea of this article is to examine available government support for Brazilian economic development that could effectively help Brazil productive sectors face the challenges of international trade, as a way to allow the country to access external markets and by this means reduces its external vulnerability.

The study supposes that the more effective and virtuous policies should be that ones that could be endorsed by international experience and foreign trade agreements and perhaps supported by multilateral institutions. These policies seem to be a benchmark that could be applied with greater probability of success and without any kind of negative reaction.

Taking in account these points, the central and more specific focus of analysis in this study will be mostly federal and local government support related to small and medium-size enterprises (SMEs), clustering and regional development and technological development.

The study will try to pursue the following main objectives:

- a) Show approaches to economic development support that had emerged in multilateral institutions and OECD countries governments in recent years, those points out three crucial issues for supporting productive activity: small and medium companies support; less developed regions support and technological development support;
- b) Describe briefly the historical process of development that had resulted in the surging of a broad and important set of SMEs in diversified productive sectors in Brazil;
- c) Analyze productive clustering in the Brazilian set of SMEs, which presents differentiated forms and patterns of productive arrangement (productive chains, nets of contracting, science parks, industrial districts) and interaction and relationship (in terms of involved actors and contents), trying to identify factors of success and failure of these clustering experiences and obstacles and opportunities related to its maturing and growth;
- d) Examine policies and instruments of national and local public support focused in SMEs, local development and SMEs productive interaction and clustering, and also perspectives for a more effective government support.

The intention of the study is, finally, to identify patterns of productive relationships that could be induced by public policies, which certainly may be successfully repeated in so many other similar experiences in Brazil.

## 1. SMEs and Public Policies Supporting SMEs: an Overview

### 1.1. An Agenda for Economic Development Policies

The broad idea of this article is to examine possibilities of government support for Brazilian economic development. The critical challenges of the external imbalances and vulnerability that pressure the economy at this moment seem to make almost impossible to keep a path of GDP and employment growth and, thus, of development. So policies that could help Brazil productive sectors face the challenges of international trade had become a crucial issue, as a way to allow the country to access external markets and by this means reduces its external vulnerability<sup>1</sup>.

The critical situation had led to a movement toward industry, agriculture and foreign trade support policies and instruments. Economists and politicians more and more argue that these types of policies should be strengthened, but proposals in general agree that any policy should be compatible with the open economy framework instead of the protectionist framework.

In other words, these policies should be compatible with international guidelines driven by WTO and with country program for inflation control. The trade agreements negotiated in WTO Uruguay round had defined new parameters of protecting national economies, which had restricted the reach and range of sectoral policies. Besides, there is no doubt that a sure way to allow inflation return is to protect oligopolies against external competition. In fact, it's hard to find in Brazil anyone defending policies that have been banned in the nineties.

So, what should government do? Economic theory says that a path of development occurs when investments, productivity gains and technological innovation allow a nation to better use their resources and by this means increase growth rate and income. Porter (1998) points out that productivity, not exports or natural resources, determines the prosperity of any state or nation. Recognizing this, governments should strive to create an environment that supports rising productivity. Accordingly to him, sound macroeconomics policies are necessary but are not enough. The microeconomic foundations for competition will ultimately determine productivity and competitiveness.

In this sense, public policies directed to foster economic development that are acceptable as a legitimate effort are that ones that try to correct big market failures and help in fighting poverty. We could include at least three types of policies in this bunch: small and medium-size enterprises (SMEs) support, technological development support and regional development support.

1) Policies related to small and medium-size companies: these policies are seen usually as a public response to a great market failure, which is economic concentration. OECD (2001) asserts that SMEs constitute an important factor of economic democracy. Besides, OECD (2001) notes that governments worldwide recognize contribution of SMEs to economic growth, employment, social cohesion and local development (see Table 1). By generating employment and income

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<sup>1</sup> Porter (1990) says that development policy could potentially play a role when a developing country needs to earn hard currency from exports due to debt overhang. See Smith (1991).

SMEs have a significant role to play in alleviating poverty and allowing regions and countries go out under development.

**Table 1: SMEs Around the World**

	% of total		
	United States	China	European Union
Enterprises	99,7	99	99
GDP	Na	60	Na
Sales	47	Na	Na
Urban Employment	53	75	70
Taxes Revenues	Na	40	Na

Source: OECD (2001) and site [www.sba.org/aboutsba/](http://www.sba.org/aboutsba/) Na: not available

OECD (2001) says that globalization and technological change had brought new pressures, opportunities and risks to SMEs. In this sense, the institution defends a framework of reference for all countries to improve efficacy of policies for SMEs issues and policies related to SMEs competitiveness in global economy. This mind set should focus entrepreneurship, innovation, clustering and industrial districts and electronic commerce. It is worth to notice that star-up firms that combine innovation and entrepreneurship are in general small firms. Part of them could fail in the market, but OECD argues that public support should be tolerant with small firms' failure.

2) Policies related to innovation and technological development support: innovation has great impact and for sure is crucial for development for the set of productive sectors. But as innovative process generates externalities market forces not always are able to driven it adequately. To deal with this market failure almost all developed and developing countries had established R&D support policies. United States, Canada and Europe countries have agencies and programs to stimulate and support innovation and technological development. It is worth to mention also international experiences, like in China and Korea, related to creation of science parks or tech parks in high technology sectors, where new companies could share services, equipment and laboratories and build information nets. Financial support and proximity with universities and research centers presents great positive potential, and can substantially facilitate company's strategies of improvement of quality and technology.

3) Policies related to regional development support: extreme poverty and inequality could be seen as a kind of market failure and it is a consensus that aid programs are not enough to solve poverty in very poor continents, countries or areas in middle-income developing countries. It could be better to establish development policies, like financial and technical support, to foster production and employment (resources utilization) and thus income and growth increase. Micro credit, for example, is one of the instruments that have been adopted in recent years.

International experience endorses these policies as a very effective way to stimulate development and because of that they are allowed by trade agreements and are supported by multilateral

institutions. These policies seem to be a benchmark that could be applied with greater probability of success in any country and without negative reactions.

## 1.2. Clustering and Economic Development

In fact, SMEs, R&D and regional policies shows many interconnections and could be worked in the same mind set with the cluster framework. In a broad definition, cluster is a concentration of firms working in related economic activities within the same geographical space, a region. This group of companies could include large firms but for sure must include SMEs. And, by definition, this group of firms must have innovation activities.

Schmitz (1999) note that growth theories, which emphasize investment, innovation and productivity, more and more put the cluster concept in a higher importance. The author mention Krugman's study about economic growth, which affirms the increasing returns from economic proximity, and Freeman and Lundvall works, that emphasizes the learning-by-interaction in systems of innovation, which join firms at national and local levels. In addition, OECD (2001) says that clustering is particularly important to access new ideas and tacit knowledge, especially in young industries.

Schmitz and Nadvi (1999) also remark that clustering could facilitate investment in small steps with small risks, since each SME could do pieces of investment in the same production chain, what is crucial in incipient stages of industrialization and development in poor regions. Indeed, this situation could occur only when companies agree in invest in a coordinated way.

In an historic perspective, OECD (2001) points out the globalization-localization nexus, which indicates that as economic activity globalizes the nature of local economies has become more important to development process. Accordingly to this report, clusters can strengthen the ability of small firms to compete successfully in the international level while continuing to exploit their local strengths.

Through proximity and networks, firms could be favored by synergies in the value-added chain, market strategies, mutual learning and beneficial specialization. Besides, a cluster encompasses alliances with universities, research institutes, knowledge intensive business services, bridging institutions and customers. Indeed, through cooperation among entrepreneurs, local institutions and government, clusters could enhance competitiveness of enterprises, promoting production modernization and entry into domestic and international markets.

IDB (2002) notes that international experience shows that a significant effect in the efficiency and competitiveness of SMEs could be reached through strengthening cooperative business ties and the organization of production among enterprises within a cluster. Networks between enterprises can be strengthened by concrete actions that are generally developed by internal economic and political agents of a given geographical area.

As a result of this broad perception, in recent years there has been increased interest in public policies directed to foster clustering. Many regions, states, provinces, cities and local communities have instituted development plans based on clusters idea, especially in developing

countries, where clusters are significant and widely. In addition, multilateral organizations, such as OECD, UNIDO, the World Bank, IDB, ECLAC, UNCTAD, the European Commission and others, are assessing and using clusters strategies as tools for regional and local development. IDB's Multilateral Investment Fund, for instance, has a program focused on production chain clusters, which support projects with features like local cooperation, SMEs's development, innovation and demonstration effect.

But clusters, simply defined as a productive sectoral agglomeration, shows great differences in terms of activity sectors, origin, matureness, and types of relationship or hierarchy among companies. Clusters in general also show internal heterogeneities. In part of them, there are big companies with stronger market power, which command contracting relations that subordinate small companies responsible for specific products and services. In other cases, when company's sizes are similar, could be seen heterogeneities related to market (segmentation) or production (parts and services specialization in the production chain).

To deal with the great heterogeneities seen among clusters and inside one single cluster it is worth to understand cluster's different origins, evolution and development level. Reasons for clustering are historic and varied: factors like demand, labor supply, pioneers enterprises surging, spillover of research centers and universities or infrastructure available could explain the cluster origin. In fact, agglomeration experiences could emerge basically in two ways: a) spontaneously, in bottom up private initiatives based on market forces, such as demand, natural resources or low cost work access; b) by aiming and initiative of the State, either directly, through centrally promoted interventions or taxes incentives, either indirectly, through formation of an environment of knowledge generation or attraction of a pioneer company to a region.

But clustering is a dynamic and evolutionary process. Porter (1998) points out that, whatever the origin, once a cluster begins to form, a self-reinforcing cycle promotes its growth, especially when local institutions are supportive and local competition vigorous. As the cluster expands, so does its influence with government and with public and private institution.

Which is why IPEA affirms that local productive agglomerations could be classified as potential, emergent, mature or advanced, depending upon the type and maturity of interaction among agents<sup>2</sup>. In the potential agglomeration the organization and interaction among agents are incipient; in the emergent one, organized local institutions for labor training and technology appears, but interaction between firms are rare; in the mature one, there are horizontal relationships among companies, but still are observed conflicts and asymmetries; finally, in the advanced one, companies' organization and cohesion level are strong, with deep cooperation and coordination relations.

The types of SMEs agglomeration also could be much different. Basically, this study will consider a typology based on the works and definitions of Schmitz and Nadvi (1994), Altenberg and Meyer-Stamer (1999), IDB (2002) and IPEA (see site) that identify the following patterns:

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<sup>2</sup> IPEA is the Brazilian economic research center. See site [www.ipea.gov.br/polind](http://www.ipea.gov.br/polind).

a) Industrial district: concentration of firms located within a specific geographic area, with predominance of small and medium-size companies, characterized by a network of horizontal and vertical relationships (since there isn't vertical integration of the production in the level of the firm), for cooperative competition, specialization in the production chain and excellence in specializations, enterprises in related sectors, offering products of good quality and price, support institutions and service providers, cultural identity which strengthens the credibility among agents, active private associations for support and common strategic definition and, finally, local level government action. The most widely recognized industrial district experience is that of Italy;

b) Agglomeration: geographic concentration of little differentiated productive activities, that forms a significant technical environment, in which relationships between local firms and institutional agents enhances positive externalities, but with conflicts of interest and/or productive hierarchies that denote low degree of coordination and cooperation;

c) Technological Parks: space that join knowledge intensive or technology intensive companies (for example, an incubator), in which the relationships among companies, local research centers, universities and institutional agencies enhance positive externalities, but that in general presents little similarity in sector terms;

d) Supply Chain Net: group of SMEs established around leader companies, which command and organize a net of suppliers in a certain productive chain, which tends to maintain geographic proximity with the leader company, even so this is not a request.

Since the discussion about cluster emerged in the studies of the successful Italian experience of industrial districts these clusters became a model, a success example or benchmarking to be replicated in others regions. Taking this approach, many clusters studies had compared a region with the Italian model, in an effort to identify lacks as a way to suggest development policies. Humphrey (1995) and Schmitz and Nadvi (1999) points out that the theoretical framework have changed in recent years: in contrast with this traditional approach, now clusters studies are moving to an evolutionary approach, that is, from models to trajectories.

### 1.3. Clustering and Development Policies

Government action towards clusters and SMEs is a promising challenge. It could be justified, as seen, by reference to the enormous potential of development, through employment and income increase, and to the market failures identified, like coordination failures and under provision of public goods (education, training, infrastructure and technological research).

OECD (2001) and IDB (2002) emphasize that a key issue in public policies related to clusters and SMEs is to enhance private enterprises participation. These institutions argue that government should let private sector lead in cluster development initiatives, and should play a catalytic role, providing catalyzing factors into the local system. Besides, the initiatives, where possible, should be taken in the most suitable level of government, which ideally correspond to the geographic scope of the cluster.

Schmitz and Nadvi (1999) add that the approach should consider a triple C concern: customer-oriented, collective and cumulative. That is, should be an evolutionary and long term process negotiated by SMEs and public agents and driven by market forces.

Despite of the fact that each cluster is a different case, with specific demands and challenges, this approach may be applicable to a set of productive arrangements. Considering that, OECD (2001) says that the role of government is to improve environment for SMEs and entrepreneurship through:

- a) Mechanisms for diffusion of technology: joint development of product and process technology, and research centers support in basic industrial technology and services (technological extension, metrology, quality control, normalization, certification etc);
- b) Mechanisms for upgrade skills of SMEs' entrepreneurs and employees: technological training and trading;
- c) Access to capital for start-ups and expanding SMEs: venture capital, public financing and guarantees;
- d) Regulatory reform;
- e) Removal of administrative burden: reducing bureaucracy and setting up "one stop shops".

Technological cooperation is crucial to maintain SMEs competitiveness and must be centered in value adding as central point. Maybe this could imply, in practices, to review production process to reconfigure productive arrangement under an interesting view of agents' relations.

An example of cluster support program is the Multilateral Investment Fund of IDB. Accordingly to IDB (2002), the program has the following general guidelines:

- a) Private sector participation: clustering awareness–building and business promotion;
- b) Demand-driven approach: more efficient access to domestic and international market;
- c) Institutional coordination: public and private cooperative effort in standardization, trademarks and stamps, logistics, training, technical assistance, technology transfer and laboratory infrastructure;
- d) Collective actions and synergies: encouraging associations, consortia (for exporting, credit access and certification) and service cooperatives (design, environmental management);
- e) Sustainability: financial and environmental sustainability.

The focus of analysis in this study, therefore, will be mostly federal and local government support related to small and medium-size enterprises (SMEs) clustering in Brazil, since they could also be associated to regional development and technology development.

## 2. SMEs and Productive Clustering in Brazil

### 2.1. Brief Summary of Historical Evolution of SMEs in Brazil

In Brazilian economy SMEs represent around 98% of the domestic business activity, and create jobs for some 60% of the urban population (45% of formal labor force)<sup>3</sup>. The country also has significant sectoral concentrations of production, that is, the presence of clusters, either in the more industrialized states, or in less developed states and micro regions; either in traditional sectors or in high technology sectors.

SMEs presence is relatively old in Brazil. In the case of the industry, it retraces to the proper beginning of industrialization, in the turn of century XIX for century XX, when SMEs had been located in pretty delimited geographic spaces. The examination of the historical experiences discloses that a wide majority of clustering processes appeared spontaneously, not induced by the government. The origin of such agglomerations could be explained by the easy access to largers markets or, a more common situation, by access for shipments of specialized manpower or raw materials (leathers, minerals, metals, forest or agricultural products).

In almost all of these experiences, however, the progress of the productive arrangement and the continuity of the agglomeration process, from a certain period, were stimulated by the action of the public sector, for times articulated by lobbies of the proper arrangement. Historical examples of industrial agglomerations in cities or regions are the producers of footwear, textiles and clothes in the states of São Paulo, Rio Grande do Sul and Santa Catarina, that are today some of the most important agglomerations with high presence of SMEs in Brazil. Its worth to mention the well known experiences of footwear and leather industries (Vale dos Sinos - RS, Franca - SP and Jaú - SP) and textile and clothes industries (Americana - SP and Vale do Itajaí - SC). We could also mention producers' clusters in furniture, ceramics and other minerals industries.

The clustering of small and medium-size farmers in primary sector also dates from more than 50 years ago in Brazil. Most part had been organized as a system of cooperative, that is, a system where all the producers associated sells their crops to a company that belongs to all of them and could trade it or add value and then sell in the market. In the following decades, however, in Southeast and South states, national and multinational big industries of foods, beverages, cigars and forest products had launched the "integration" relation with poultry, porks, milk, grape, tomatoes, tobacco, tea and wood producers.

Besides, in the Brazilian case, also had surged many industrial clusters as consequence of state initiatives. In general terms, they are newer historical experiences than the previous, but almost all of them had initiated along the 50-60-70 decades, period of deep state intervention that came before and at certain extent had caused Brazilian fiscal problems. In these cases, the initial impulse was a combination of incentives and effort to: create a critical mass of knowledge and human capital; create a state-owned company; attract a big private company for one region; or provide great financial support or tariff protection.

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<sup>3</sup> See IDB (2002).

The Research Financing Agency (FINEP), for example, that was created in 1967 with the objective to foster the infrastructure of technological research in Brazil, fostered investments in universities, laboratories and research centers. A common fact is the emerging of companies in high technology activities (informatics, electronics, aeronautic, biotechnology and raw materials) as spin-offs of these science and technology centers supported by public sector. Many times the surging of these productive arrangements not only had involved creation of infrastructure and institutional conditions that gave chance to the sprouting of local knowledge, but also the support in shifting this knowledge in innovation through creation of pioneer state-owned companies or support for private companies.

The main Brazilian historical experiences of universities and research centers that had sprouted businesses are located in the cities of Campinas (computer science, electronics and telecommunications industries), São Jose dos Campos (aeronautic and aerospace industry) and São Carlos (new materials, optics and precision tools, mechanics and automation) in São Paulo state; Belo Horizonte (biotechnology) and Santa Rita do Sapucaí, Itajubá and Pouso Alegre (computers and telecommunications industries) in Minas Gerais; and Florianópolis (software), in Santa Catarina. Embraer, in the aeronautical sector, for example, was created as a pioneer state-owned company with the military goal of increase national knowledge in defense and aviation field. Biobrás, in Belo Horizonte' biotechnology cluster, according to Lemos (2000), had surged guided by import substitution and was helped by financing and domestic market protection.

This is also the case of productive arrangements of SMEs that appeared by indirect intervention of federal and state governments related to attraction of big industrial companies. These companies formed their supply and demand nets in which the SMEs were included. It is the case of the car assembly industries, and respective local suppliers (in ABC and Vale do Paraíba regions of São Paulo and in Belo Horizonte area, Minas Gerais). Also it seems to be the case of petrochemical industry in São Paulo and Rio Grande do Sul and the medium-size companies that demands plastic resin.

The nineties are marked by enormous transformations of national economic system, which included less tariff protection (economic openness) and economic integration in the globalization dynamics. The changes, besides, had included privatization and new regulation, especially in property rights issues. The old industrial policy was dismantled. The only great exceptions were the support to auto and computer industries. The auto industry could increase production and investment in machines and products, helped by: a) a sector agreement that defined lower sales taxes; b) the negotiation of an automotive industry agreement in the Mercosul, which allowed Brazil to keep import tariffs higher than the national average. Besides, government gave residual protection to informatics industry by a law called “basic productive process”, but could not avoid the decline of national production.

For sure, as case studies points out, this situation had launched a huge competitive challenge to SMEs operating in the country. The competition environment brought by massive penetration of foreign products in domestic market raised standards of quality, price and technology. Besides, macroeconomic policy, which put at first the fight against inflation, added, during the decade, high interest rates and a permanent credit crunch, joined by periods of strong fiscal restraint (between 1990 and 1992 and since 1999) or of currency overvaluation (from 1995 until 1998).

The launching of Real Plan allowed an increase in domestic demand, and the currency overvaluation helped Brazilian companies to import cheaper raw materials, parts and machines, replacing national supply. In many cases, industries of many sectors were able to modernize and reduce production costs. But in the other hand, strong competitive pressure over productive activity finally induced the disarticulation of some production chains.

The local companies, especially SMEs, had had enormous difficulty in survive and react to the adverse recessive macroeconomic context of high interest rates and exchange rate overvalued. And the fiscal adjust halted public support to production. In the aftermath, economic concentration increased and companies did huge cuts in personnel pursuing to survive. Despite all the competitiveness effort, the harder foreign competition observed become unsupportive at that moment and led to higher unemployment. The industries marked by exceedingly labor intensity and technological gaps disappeared. It was the case of many textiles, clothes, leather, footwear and machinery industries. Electronics and communications sectors had also had deeply disarticulation in productive chains.

In that tough economic context, the quantity of SMEs operating in mature industrial clusters increased a lot, in a process called “terceirização”, that is, the process of transferring tasks for suppliers in productive chain. The main reason seems to be costs reduction either through specialization in core business or through the shift of direct workers in small suppliers, as a way to avoid high cost labor laws. Bercovich (2001) points out that in the period 1995-1998 the software cluster of Blumenau reduced the number of workers, but increased by 40% the number of companies. Botelho and Garcia (2001) also notice that in Franca the number of shoe industries grew in the decade, while the number of employees diminished. Also in aeronautical industry of Sao Jose dos Campos, great number of SMEs appeared as long as Embraer started cutting jobs.

The number of SMEs had increased a lot in this process. Moreover, also SMEs relations in productive agglomerations had increased. However, a hierarchy had also emerged inside clusters and, therefore, a dependent relation between SMEs and big companies. As Botelho and Garcia (2001) argues, these new and many times informal companies hold back the biggest impact of production adjusts and crises lived for the big companies, and they show higher mortality rates.

As Brazilian industry was facing hard times in mid 90s, the productive agglomeration that had surged in those years operates basically in primary and tertiary sectors. Producers of tropical fruits in Rio Grande do Norte, Pernambuco, Bahia, Tocantins and Espirito Santo and of shrimps and lobsters in Ceará, Rio Grande do Norte, Bahia and Sergipe appear in Brazil. Tourism clusters also grows, like Bonito, in Mato Grosso do Sul, and Sauipe, in Bahia.

In agriculture, cooperatives system, which is based in the idea of productive cooperation, enters in crisis, smashed by credit shortage. The agro-industrial production chains start then a strong process of internationalization and move towards to the integration system, a strong hierarchal relation handled by big national and transnational industries.

Though lower public support to production became the new rule, new agglomerations appeared as an outcome of taxes benefits offered by states and municipalities in a race to the bottom – the

“guerra fiscal”<sup>4</sup>. New plants of auto assembly, mobiles and computers were installed in Brazil, mostly as consequence of state and federal support. We could mention cars plants in Curitiba - PR, Porto Alegre - RS, Juiz de Fora - MG, Resende - RJ and Salvador - BA, and computers and telecommunications plants in Campinas. These companies organized goods and services supply nets. It is worth to mention that incentives to business attraction also had stimulated the surging of other new clusters, like textiles and footwear in northeast region, crop and industrial transformation of cotton in Mato Grosso and pharmaceuticals in Goiânia and Anápolis - GO.

During the past decade gradually had increased the entrepreneurship effort through companies’ incubators and mechanisms of venture capital. Incubators are places reserved to entrepreneurs whom wish to start micro and small companies but don’t have capital and infrastructure. The enterprise stays for a time in the incubator, three years in average. In this period, the incubator will provide space, infrastructure and consultancy. The National Association of Entities that Promote Advanced Technologies Enterprises (Anprotec) list 135 incubators operating in Brazil.

In general terms, Brazilian incubators had been created as an initiative of universities and research centers or local development agencies. In São Rita do Sapucaí, for example, National Institute of Telecommunications (Inatel), School Technique of Electronic (ETE) and College of Administration and Informatics (FAI) had created its incubators; in Campinas, the local agency named Company of Development of the High Technology Cluster of Campinas (Ciatec) created its incubation program. Many times private enterprise associations have had a crucial role, directly and by mobilization of local support (public policies or development agencies). This is the case of Biominas Foundation, Blumenau Software (Blusoft) and Association of Aerospace Brazilian Industries Aeroespaciais (AIAB), all of them created in the beginning of the nineties.

After years of competitive pressure and production adjustments, the new exchange rate regimen adopted in 1999 and currency devaluation observed since then allowed better relative prices for domestic producers. Such reversal meant indeed a new opportunity for Brazilian SMEs to survive offering good quality products. But technology, market access and financing conditions offered to SMEs remain critical issues.

Successful cases of technological advance pushed by national clusters still are rare in Brazil. But even when companies have advanced technology products, scale, credit, partnerships and patents abroad are obstacles. SMEs may also show competitive weakness in marketing force to access foreign markets. Bercovich (2001) argues that entrepreneurs usually have an excessively technical profile. The entrepreneurs, either former academic or former employees of other companies, many times don’t have management and marketing skills. Debt conditions (costs and maturity) are unaffordable, and requirements (guarantees, chronograms, red tape) still are high barriers to loans. Risk capital only now starts to gain some relevance. The biotechnology cluster, for example, that launched some innovative products and is pioneer in paternity tests in Latin America, exports a little share of its production.

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<sup>4</sup> Brazilian’s states basically offers capital or credit, in the same amount of the Taxes on Circulation of Merchandises and Services (ICMS) due.

Technological basis clusters could have hard times to conquer a stronger position in the market. But maintain this position is even harder. Belo Horizonte biotechnology and Sao Jose dos Campos aeronautics clusters are examples. In these cases, their success has meant a threat and a business chance for worldwide leader companies in these sectors. As result, a strong competitive fight against external competitors has been observed.

Pinho, Cortes and Fernandes (2001) points out the implications of foreign competitors in the same markets: “even when the Brazilian technological base company (TBC) could surpass the initial obstacles and consolidate a strong position in its market, probably they still will face hard times to keep growth and capital accumulation. Above all, difficulties for growth must be related with market positioning possibilities in a peripheral economy highly opened to imports and to foreign direct investment ... To be able to maintain the success, Brazilian TBC has to locate itself in markets where it does not have perspective of fast and powerful competitive fight of foreign competitors. This capacity of isolating of foreign competition generally is only present where the disposal of foreign suppliers to operate in Brazil is relatively low”.

Embraer, for example, after acquiring technological expertise and increase its exports, became target of competitive fight by Canadian competitor Bombardier. The dispute not only involves known litigious in World Trade Organization (WTO) but also job offers in Canada to cluster’s workers. Besides, French aeronautical and aerospace companies bought part of Embraer capital. In Belo Horizonte biotechnology cluster, the leader company Biobrás faced strong competition of Danish Novo Nordisk, worldwide leader in pharmaceutical market, and even had complained about underselling in public biddings, but it finished being forced to sell its main industrial operation (insulin’s production) to the allegedly unfair competitor. Now these companies probably will expand technological cooperation abroad and reduce domestic relations inside the cluster.

## 2.2. SMEs Productive Clustering and Interaction in Brazil

There are many SMEs productive agglomerations in Brazil, in different sectors, with varied size, number of companies and relationships, as showed above. Britto (2000), Britto and Albuquerque (2001), Suzigan, Furtado, Garcia and Sampaio (2000), like IPEA and Minas Gerais Industries Association (FIEMG), also offer a good sample of examples of clusters in Brazil. Besides, FIEMG and other entities also launched RedeCluster - Brazilian Clusters and Enterprise Competitiveness Net with the objective of sprout cluster concept, map productive agglomerations and foster cluster development<sup>5</sup>.

Most part of the clusters could be classified simply as agglomerations. In general, these agglomerations involve activities related to traditional sectors (traditional industry, farming and tourism) and presents important economic dimension. As said above, there is a great difference among them in terms of intensity, complexity and dynamics of cooperation and conflict among the companies.

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<sup>5</sup> Site [www.redecluster.org.br](http://www.redecluster.org.br).

It is hard to say that any Brazilian productive arrangement had evolved to reach the situation of the paradigmatic case of the Italian industrial district. But considering the relationships inside the cluster the ones that seem to be closer to the Italian experience are Criciúma's ceramic industry of Vale dos Sinos's footwear and leather industry, which shows important cooperative effort, after years of turbulence and conflict brought by currency overvaluation.

There are clusters marked by contracting nets in assembly productive chains, like automobiles, telecommunication devices and computers industries. Sao Jose dos Campos's aeronautic cluster is an interesting case. Though it has appeared as technological park, very close to Technological Center of Aeronautic (CTA) and Technological Institute of Aeronautic (ITA), since privatization of Embraer starts to seem more and more as an agglomeration based on contracting net commanded by that company.

Clusters classified as technological are fewer in Brazil and they are involved basically with information technology, biotechnology, new materials and chemicals, usually operating inside universities and research centers, including companies graduated or operative in incubators. It is case of software in Blumenau, biotechnology in Belo Horizonte, and telecommunication and computing in Campinas. Anprotec calculates that, considering all the incubated companies, 83% are located on universities and 17% on research centers.

Based on these examples, it is possible to identify patterns of clustering and productive agglomeration in Brazil. These patterns are summarized in Table 2, and could be seen in more details in Annex 1.

**Table 2: Patterns of Clustering and Productive Agglomeration**

Origin	Initiative	Format	Typical Sectors	Size
Demand and Natural and Human Resources Access	Spontaneous	Agglomeration Industrial District	Traditional Industry Farming Tourism Plastic	MSME
Tax Incentives	Direct state intervention	Agglomeration	Traditional Industry	MSME
Attraction / Creation of Leader Companies	Indirect state intervention	Contracting Nets Productive Chains	Automobiles Electronic Mechanics Information Technology	SME
Investment in Education and R&D	Direct state intervention	Science Parks Incubators	Aeronautic Information Technology Electronic Biotechnology	MSE

Source: author elaboration.

The Brazilian experience show that, regardless SME agglomeration origin, the productive synergies of participant companies still seems associated mainly to external economies attached to geographic proximity. But we must say that in almost all the cases were identified some kind of productive relation among companies. The benefits and externalities related to proximity include almost always labor skills; attraction of correlated activities industries and support services, including equipment and inputs suppliers; knowledge diffusion; information sharing and other benefits. In Franca footwear cluster, for example, accordingly Botelho and Garcia (2001), there is a second hand machinery market.

Brazilian clusters show some real experiences of SMEs interaction, either with public sector, private enterprises associations, support entities, universities and research centers or with companies' customers, competitors or suppliers. Such experiences had involved production, market access, logistic, procurement, training, diffusion of knowledge and information, innovation and technology development, infrastructure improvement and political pressure. These points deserve a detailed analysis.

In general terms, the analysis of the Brazilian clusters shows that during its consolidation SMEs and support entities, universities and research centers had built solid relations focused in human resources training, quality improvement and technology. In the other side, the relationship with public sector and private enterprises associations is more recent and fragile. But the crucial point observed is the weak productive cooperation among companies inside these clusters. This kind of cooperative action is still in the first steps. Few SMEs are prone to work together, and when it occurs, the actions are very restricted and almost always limited to vertical interaction along productive chains. The relationship with customers and suppliers in productive chains is frequent, but very asymmetry and limited to quality improvement. Horizontal cooperation with competitors includes only information sharing through informal talks.

The relationship between SMEs and public or partially controlled by public sector agencies, such as Brazilian Micro and Small Companies Support Service (SEBRAE<sup>6</sup>), National Service of Industries (SENAI), Institute of Technology (IPT), Brazilian Company of Agriculture Technology (EMBRAPA) and CTA is very important and allows the companies of each cluster to reach many devices: a) quality control (standards definition, quality certification); b) technology diffusion; c) labor training; d) management training (courses and lectures directed to human capital development, access to technical and markets information, meeting place). As IPEA points out, the sprouting of these relations means the transition of a potential to an emergent agglomeration. There are many examples.

Bernardes (2001) says that CTA, in its functions of teaching, technological development, metrology and standardization, qualification and homologation of companies and products, was crucial for the development of the aeronautical cluster. The author also notes the role of SENAI

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<sup>6</sup> SEBRAE is a private, independent, nonprofit institution and comprises the national office in Brasilia and one SEBRAE agency in each country's state. Note that by Federal Laws 8.029/90 and 8.154/90 (12/04/1990), Congress approved the replacement of Brazilian Small and Medium Companies Assistance Center (CEBRAE), public agency for small companies support, by SEBRAE. This institutional change gave a more important role to private sector in SMEs support.

and Technical High School Everardo Passos in the improvement of industrial manpower. Botelho and Garcia (2001) also show the relations of SMEs of Franca footwear arrangement and SENAI, SEBRAE and IPT.

New initiatives in this area have reached many clusters<sup>7</sup>. But there is a perception that the lack of funds, materials and well-paid human resources, caused by public sector financial restraints, do not allow these agencies to offer better services. Interaction with near universities and research centers are crucial for clusters. As a matter of fact, in the case of science parks this is a previous and necessary factor to the sprouting of these companies. Brazilian universities have done a very good work in undergraduate and graduate education, and they offer useful specialized services. Partnerships and cooperation between companies and university and technology centers in the field of product and processes development are still rare and weak, despite of the great potential of interaction. But in recent years the universities have been trying to change this situation through many facilitation mechanisms<sup>8</sup>.

But lots of things still are missing and partnerships with technological institutions are unusual. In Blumenau's software cluster the ties with university are informal, basically involving teachers who at the same time are company's employees or owners. Belo Horizonte's biotechnology and Sao Jose dos Campos's aeronautic clusters have serious problems related to lack of agility, bureaucracy and legal requirements in partnerships with public agencies, factors that halt technical cooperation agreements<sup>9</sup>.

Private enterprises associations have had an increasing role in supporting and keeping closer clustered companies. Blusoft in Blumenau and Biominas in Belo Horizonte, for example, had provide labor training, management and marketing courses and lectures, export promotion, marketing actions, companies incubators and information disclosure. But for certain there is large space for further support. Fajnzylber (2001) points out support demands in searching public financing and in caring out public regulations. Bercovich (2001) notes, besides, that such entities

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<sup>7</sup> Examples: a) furniture in Votuporanga - SP: Technological Center of Wood and Furniture Professional Formation was created to provide laboratory tests, CAD CAM systems and workshops – the investment was carried by SENAI, Votuporanguense Foundation of Education and federal government; b) plastics industry in ABC - SP: SEBRAE gave financial support to a technological assistance project called Mobile Units for Technological Assistance to Micro and Small Size Companies (Plummet), by which two vehicles with laboratories and IPT and INP specialists visit SMEs factories; c) apple and peach producers of Fraiburgo, Sao Joaquim and Urupema - SC: for request of European customers, Embrapa, Company of Farming Research and Agriculture of Santa Catarina (Epagri) and Brazilian Association of Apple Producers (ABPM) introduced fruit quality monitoring since the farm until retail.

<sup>8</sup> Examples: a) University of São Paulo (USP): created Disque Tecnologia, a technology consulting service; b) Federal University of Minas Gerais (UFMG): created, in 1997, a service that helps to tie university and companies, as well as stimulate entrepreneurship in the university (by incubators and innovations); c) Agricultural Federal University of Rio de Janeiro (UFRRJ): through agreement with SEBRAE, launched in 1999, offers technical support in handling milk cattle to small producers of Itaperuna and Conceição de Macabu - RJ.

<sup>9</sup> Lemos (2000) points out the fragility of Belo Horizonte biotechnology cluster in sustaining a local net of knowledge and a path of technological progress that could keep it updated with the technological frontier. According to the author, local universities have significant knowledge, but scientists disagree in transferring codified knowledge. So, firms spend too much time in product development, given their limited internal research capacity. In these circumstances, Biobrás, the local leader firm that could catalyze public and private agents effort to create knowledge and develop technology, have been led to move away from the partnership with local biotechnology R&D system, and to associate with centers abroad, as a way to speed up innovation and thus keep on running.

should be the nexus between entrepreneur's requests and local agencies and political forces. Legal and exporting effort support would also increase in the scope of these organizations.

The relationship between SMEs and local government can be evaluated by many angles. During nineties these relations involved land offerings and state and municipal taxes exemptions to new companies<sup>10</sup>, but many criticized these benefits because they meant an unfair competition for companies already established. Recently, however, state governments, municipalities and local development agencies have increased emphasis in productive cluster support, especially through incubators, infrastructure improvements and industrial parks that provide synergies and lower fixed costs. This movement, no doubt about, is a reaction to local SMEs association's demands. There are many examples, which almost always involve inland regions. In Santa Rita do Sapucaí electronics and information technology cluster, company's owners asked state and federal governments improvements (asphalt recovery, airport, and flood prevention). Similar movements, related to infrastructure works, are in process also in Bonito tourism and northeast fruits products clusters, in which SMEs demanded, respectively, an airport to increase tourist flow and regular water supply to irrigate and increase production<sup>11</sup>.

The SMEs interaction experiences that advanced more had been those inside supply chains. Supply nets coordinated by a big company are an old phenomenon in Brazil. But this kind of productive arrangement increased during nineties, since big companies had opted for specializing themselves and externalize activities. The aftermath was the increase of contracting relations with SMEs. In a broad perspective, the hierarchical relation guarantees to SMEs technical support and purchase commitment, but also brings asymmetry relations with contracting companies, in which dependence, conflict and fragility have been usual and result in price and profit decrease. Many studies show that in these cases the benefit stays at big companies' side.

The change in big companies' productive strategies strengthened subordinated and dependent relations inside clusters. Souza (1993) says that main benefits for big companies that choose to increase supply nets are specialization and scale economies, and by this means costs and risk decrease (because the structures become leaner). But big companies externalization of activities did not assure cooperative relationship. Big companies requests suppliers to improve quality levels and to increase investments in equipment. SMEs that wish to participate in supply chains often are unable to reach these scale and quality requirements. In these cases, the SMEs are excluded or become subordinate to a new productive link in the chain, an intermediate level between them and the leader company.

In assembly manufacturing arrangements these hierarchies of activities and suppliers become much more important. It happened, for example, in metal-mechanics assembly clusters, like the automotive and aeronautic clusters. In traditional industry, especially in footwear and textiles, this process is also intense. As example, in Franca footwear and in Americana, Blumenau and São Paulo textiles and clothes, parts and services supply chain function as a way to reduce labor

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<sup>10</sup> The taxes are basically ICMS, IPTU and ISS.

<sup>11</sup> It is interesting to notice that tough municipalities almost always have a pro-active behavior it depends upon politic considerations. In certain cases, the mayor fears the risk of increase single sector local owner's economic and politic power, in the extent that a sector crisis could become a region crisis.

costs and to easy production adjustments. Small and medium-size's farmers clusters are very common in Brazil, and are connect by hierarchical nets articulated by food (dairy, poultry, pork, tomatoes etc), beverage (orange, grape, malt and tea), tobacco and pulp industries<sup>12</sup>.

Horizontal relationship inside clusters, based in collective and coordinated action, is a less usual phenomenon. Relationship among these competing entrepreneurs demands high reliance as well as an associative mentality, and still is restricted. This potential can be mobilized through representative organizations, natural place for this approach. As a basic rule, the relation between competing companies is marked by rivalry, and the interaction depends on that the cooperation profits could surpass the competitive idea that it is better to weaken the rival.

Structural, geographic and cultural aspects can facilitate cooperation. Segmentation in different market niches or operation in complementary products could bring a better will for horizontal cooperation, in the extent that does not define the actors as direct competitors. Cohesion and will to cooperate are also bigger when one cluster is placed in well-delimited geographic spaces, or have greater cultural or ethnic homogeneity. In these cases, SME owners in general know each other, have the same background or even have family relations. For instance, cooperation is easier in Alto Tietê and Holambra flowers producers, since they present this kind of homogeneity – descend, respectively, from Japanese and Dutches. Interaction includes flower fairs and R&D activities (flower varieties and new hybrids), besides labor qualification, quality certification, foreign markets prospecting and participation in international fairs.

The urgent challenge to reach a better insertion in foreign market has conduct to coordinated initiatives in foreign trade, including common sales structures, surging of export consortiums, export promotion, creation and advertising of clusters trademarks, products and design development, and human capital qualification. Marketing actions involve presence in businesses fairs, offices outside, products and regions prospecting, including information about regulation requirements. Competitive difficulties in these areas are well known, but government efforts are stronger at the present moment. Franca and Vale dos Sinos footwear SMEs national producers, for example, are in a subordinated position, because they export through agents that control trade canals and product and design development. Proper trademark exports are restricted to Latin America. Only biggest companies have already launched trademark in U.S., the biggest foreign market. The competitive challenge of SMEs in these clusters is to establish a trademark and a proper trade canals outside, and by this means to extend the added value in exports.

Cooperation in technological development is yet unusual. In Criciúma ceramic cluster, the medium-size outstanding companies, such as Eliane, Cecrisa and Portobello, had articulated a

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<sup>12</sup> In Santa Catarina pork and chickens cluster, farmers not only supply animals to industry, but also maize and wood to power refrigerate storage rooms. The farmer receives from industry the young animal, animal food, vitamins, medicines and technical support (land analysis and seeds indication). In Fraiburgo, Sao Joaquin and Urupema apple and pear productive arrangement, as the same, the biggest companies, who have refrigerated boxes, coordinate farmers, which receive inputs and must sell half of production to contractor. The milk small farmers in general receive by dairy industry veterinarians' support, training, credit endorsement (especially for investment in milk storage tanks). Tobacco leaf farmers of Vale do Rio Pardo count on purchase commitment, quality improvement support, seeds and defensives supply, handling techniques courses and insurance against hail. Finally, Vale do Ribeira tealeaf farmers practices a technical partnership with industry, which started on fifties.

strategical study of competitive positioning vis-à-vis Spanish and Italian competitors. Such study should direct future cooperative actions in technology, design and marketing. Vale dos Sinos footwear and leather cluster, represented by 15 entities, return to well succeed past actions and have initiated Support Program to Rio Grande do Sul Leather and Shoe Industry (Procalçados), a joint work with Rio Grande do Sul Research Support Foundation (FAPERGS). They intend to foster innovation in the productive chain (machines, processes, products, environment and management). Along with this, supported by Apex, Abicalçados and Couromoda, producers have been organizing stands in international fairs and trademark promotion (Shoes from Brazil).

The lack is greater in technology clusters. In the experience of the productive arrangement of Blumenau, says Bercovich (2001), associative awareness is common and the main practice of productive relationship is software integration and features adding. But even there the dispute for qualified personnel inhibits cooperative actions in product development. Lemos (2000) and Fajnzylber (2001) also points out that in Belo Horizonte biotechnology cluster reduced scale and number of firms seems to be an obstacle to knowledge sharing. Inter-firm cooperative relations and interactive learning seem to be fragile and fragmented, cumulative specific knowledge at companies' level seems rare. Technology development still depends upon individual knowledge gotten through previous experience in universities and local research centers<sup>13</sup>.

But company owners had begun to mobilize their companies through cooperative initiatives. São Paulo Industries Association (FIESP), in 1998, tried to identify obstacles in clusters established in São Paulo state. FIESP had done initial works in Franca leather and footwear sector and in Votuporanga furniture and wood. In Franca, according to Botelho and Garcia (2001), the results had not been the intended ones, since SMEs had huge difficulty in work together to implement the proposals. The result, in practice, was a group of companies' deal in work together in design issues. In Votuporanga the idea was to create a design and professional qualification center, but it became reality only through local government and federal agencies support.

FIEMG has made in recent years a strong work of institutional support to SME local clusters. With such concern, FIEMG created Cresce Minas project and identified state clusters and regional vocations - had been identified 47 potential clusters, operating in 20 sectors. These clusters were evaluated in its economic possibilities. Santa Catarina' enterprise association launched a survey that identified 8 productive chains and 48 productive arrangements. In both the cases, the purpose seems to be mobilizing company's relationship and local government and development agencies to carry through supporting actions.

These concrete examples of SMEs productive relationship in Brazil involve an enormous variety of situations. The improvement registered is countless, but also are clear the problems in conquering a deeper interaction. But it could not be different: under the general idea of cluster relationship one can find many possibilities of joint actions, of different set of actors, operating in very different sectors and agglomeration formats. Some of these interactions are easier than

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<sup>13</sup> Mendonça and Botelho (2001) present SENAI - SP survey with a sample of companies that confirms this reality. Only 22% of the searched companies affirmed to establish some kind of partnership. In the group of companies that declared to establish cooperative actions, the biggest ratios were in partnerships with suppliers (64%) and customers (41%) – far behind stayed partnerships with associations (18%) and research institutions (7%).

others. In fact, there are a list of interaction possibilities: a) in terms of scope, had been identified cooperative initiatives in supply purchase, foreign trade, logistic, technology development, labor training, information, infrastructure improvement (energy and communication) and political action (to influence regulation, taxation and budget issues); b) in terms of actors involved, SMEs relationship could be horizontal (among competing companies), vertical (with suppliers and customers), or with private enterprise associations, local government (cities, states and agencies), research centers and, finally, universities. In this bunch of alternatives, many seem viable; others are possible but hard, since they demand specific actors with adequate cooperative attitude.

In conclusion, it seems that Brazilian clusters and SMEs need to advance a lot in many issues. IDB (2002) make a point that major weakness are limited access to financial and marketing services; limited management skills; low technological level; and lack of business cooperation and of strategic business positioning. More over, IDB (2002) points out that, despite of SMEs show certain levels of productive specialization and cooperation among themselves, they are far from having a network of relationships and a level of integration that distinguish the organizations of production of the industrial districts.

SMEs cooperation related to resources and supply chain (labor, goods, services, information) is the easiest one, since there isn't conflict or opposition. In fact, it is the very first stage in cluster cooperation. Foreign trade and marketing also are common initiatives of SMEs interaction. These efforts find low resistance, with exception of contractors in productive chain, which may not have interest in sharing suppliers. SMEs political action, lobby and relationships with local government to demand issues of regional development and infrastructure improvements are also very important in productive clusters based on natural resources, labor supply and tax incentives.

But, in management and technology development, SMEs need for sure to interact more with R&D centers and universities, as well as in vertical relations along productive chains. Private associations are also crucial for diffusion of ideas, especially in IT clusters, because either technology progress is faster or companies are smaller, with no experienced entrepreneurs in management functions.

### **3. Public Policies of Support for SMEs in Brazil**

#### **3.1. National Government Economic Support for SMEs**

Development policies related to productive sectors, which includes industry, agriculture, small firms, technology, foreign trade and local development supporting, changed deeply in Brazil during the first half of nineties, in a context of economic openness and privatization. These types of policies had gained then a very particular shape, which emphasized systemic competitiveness and horizontal intervention, that is, policies applicable to all sectors and to companies of any size.

Connect to that, was the assumption that a better macroeconomic context (price stability, lower interests rates and taxes) could be enough to improve competitiveness of companies in the country. This notion of competitiveness, summarized in the expression “custo Brazil”, largely used in business and academic discussion inside the country, became the basis for policies supporting productive sectors. In that period incentives and subsidies to specific productive sectors become prohibited, and industrial policies had directed toward quality and productivity gains issues, as the best way to leverage competitiveness and assure a competitive insertion even with strong foreign competition. So, government had launched then the Brazilian Quality and Productivity Program (PBQP) and the Industry Competitiveness Program (PCI).

Brazilian macroeconomic policies were, at that time, tangled in the traps of the price stabilization program, which conduct to increasing trade deficits. Unfortunately, the external imbalance became unbearable risky after a series of external crisis (Mexico, Asia, Russia, Turkey and Argentina). The problem got even worst after 1997, because of the world economic slowdown and the negative evolution of international prices of commodities exported by Brazil.

These external restraints had leaded federal government to adopt recessives policies like increase interest rates and tax burden imposed to companies. In particular, federal government increased taxes on sales (social contributions called PIS and COFINS), which are cumulative in productive chains, damaging systemic competitiveness and increasing transaction costs. These critical problems affected Brazilian productive system, an above all the industrial structure.

In the turning of the century, Brazilian economy could stand any more this turbulent and critical situation. National currency has been devaluing dramatically since then. More over, the creed in horizontal intervention to support economic development has been challenged. Federal and local government agencies and policy makers indeed have been revising important aspects of public policies in Brazil.

In recent years, in this context, federal and local government had given greater attention and considerable support to policies focused in clustering, technology, regional development, SMEs and export promotion, within the wide set of public policies related to competitiveness and development. Since then, SMEs support reached a better status, given SMEs relevance in terms of employment and local development.

Mendonça and Botelho (2001) say that SME support policies started to change in mid nineties. In fact, SMEs support policies were requested by the clause of differentiated treatment to these companies, included in the Constitution enacted in 1988, but was implemented with many years of delay. A more forceful public policy focused in SMEs really started only when the external crisis became visible. The adoption in 1996 of simpler and lower taxation for SMEs (the Simples legislation) was very important. Besides, SEBRAE started support initiatives and BNDES go through a deeper role in SMEs financing.

This was an expressive change, because until then productive system support was centered in big business, especially because the role fulfilled by BNDES and state-owned companies.

However, because of the strongly adverse economic context, the instruments launched had not really meant an additional support, but only a relief face increasing difficulties. The Simple tax legislation and the new financing facilities for SMEs basically neutralized the negative impact brought by increases in tax burden and interest rates, which would have been unbearable for small companies.

More recently, public sector in Brazil has done a stronger effort to help SMEs enterprises surging and growth in high technology sectors. We also could see currently public policies centered in SMEs relationship and cooperation, as well as an increasing attention to issues like economic geography and productive specialization according to regional vocations and productive agglomerations. The cluster approach, after moving from academic area to private enterprise associations, has become a public sector concern, given to the externalities involved and the perspective of higher collective efficiency. Despite of the high level of specificity of each cluster, related to sector and regional differences, it seems possible to reproduce pioneering experiences in the set of local productive arrangements.

New support policies are being created at different government levels and public agencies, and may achieve a crucial role in the set of development policies. Federal government support policies for SMEs have been conduct, in ministry level, by Development, Industry and Commerce Ministry (MDIC) and by Ministry of Science and Technology (MCT), through its agencies, like BNDES and FINEP, and also in partnership with SEBRAE. State-owned financial institutions also had launched some other programs. In some cases, programs and instruments were created as a join effort of many agencies; in others, a single productive arrangement received support from several programs and entities. Now we have seen institutional changes towards a more coordinated and integrated effort, and this demands a redefinition of federal agencies' responsibilities and programs.

Local government role in this kind of development policy also increased. As pointed for Cassiolato and Brito (2001), state and big cities governments have been working more actively in supporting productive sectors and clusters' investments and performance. Public action, therefore, has becoming increasingly broad and synergic.

The most important program launched by SEBRAE is the Technological Support to Micro and Small Companies Program (PATME), a partnership with FINEP. The main goal of PATME is to offer consulting to SMEs as a way to allow access to technology and knowledge. In 1996-2000, 213.000 companies had been helped, in economic and technical feasibility studies and in

improving, adequacy, rationalization or development of products, technology, equipment and processes, of design and modeling of products, energy conservation, and certification and quality control labs. BNDES also implemented in 1991 Technology Equity Fund (CONTEC), that wants stimulate the sprouting of small IT companies.

SEBRAE targeting has been changing. The agency, until now focused on entrepreneurship and individual companies and entrepreneurs support, is now more and more focused in productive agglomerations support. PATME is an example of this new approach. At first, this program provided support to individual micro and small producers of goods and services. Since 2001, it have been entering a new approach, focused in helping groups of companies of one same sector, through technological research centers, universities and technical schools.

SEBRAE has trying to identify and select cases of SMEs productive concentrations that could be similar to industrial districts as a way to disseminate the industrial districts model in Brazil. In this sense, SEBRAE is developing an experience of productive agglomeration support, by means of the improvement of associative capacity, crucial point for success in Italian experience in partnership with Inter-American Development Bank (IDB) and Promos, a business-oriented promotion agency of Chamber of Commerce of Milan. The achievements of this program could be used in others experiences around the country. According to IDB (2002) the “objective of the program is to help increase the competitive capacity of the small enterprises that produce goods and services in the selected industrial districts. The program would initiate actions to strengthen business cooperation, help mitigate basic obstacles confronting the small firms and the productive work force, taking advantage of business opportunities related to existing technological capacity and applying lessons derived from international experience”.

Under the program, the SMEs will be mobilized to achieve competitive development through greater collaboration among businesses and common strategic definition, thereby reinforcing business opportunities related to natural resources or existing technological capacity and regional economic development. The impact of cooperation is supposed to be even broader as it leads to an imitation effect among enterprises and facilitates the use of new technologies and market access. This is a kind of experimental pilot program that deals with relationship, interdependency and affiliation inside a local productive system with a local culture.

From 24 proposed clusters in different sectors and geographic regions of Brazil, SEBRAE selected by socio-economic, political and institutional aspects (sectoral concentrations of small companies, employment, income and development potential, institutional environment, local government and private sector participation, culture of cooperation among enterprises and linkage between enterprises and technological institutions). The project is being developed in 3 productive agglomerations, each one with a different level of development and location: a) Nova Friburgo, Bom Jardim, Duas Barras, Cordeiro and Cantagalo Region – RJ: lingerie industry which counts 20% of domestic total production and nearly 600 formal and informal enterprises; b) Paragominas – PA: 70 SMEs producers of wood products and furniture; c) Campina Grande and Patos – PB: 615 formal and informal producers of leather goods and footwear. SEBRAE and IDB will give financial resources (US\$ 4 million, equally distributed between both) and Promos will offer technical assistance and market access in Europe.

Banco do Nordeste' SMEs Market Expansion Program deserves mention. It intends to increase SMEs local productive chains competitiveness and foreign trade. The perception that credit for isolated SMEs was increasing its credit risk, that is, was raising payment default, moved Banco do Nordeste to targeting cooperative and private associations and export consortiums. The bank set US\$ 120 million in resources to this program, and signed a contract with IDB, for a US\$ 150 million credit operation, and an agreement with MCT, which, besides a US\$ 30 million funding, will offer expertise in clusters identification, technical training and advice. The program supports companies with sales up to R\$ 6.1 million a year, in operations that in average reach R\$ 200.000.

The National Program for Software Exports (Softex) also is directed for SMEs, since small companies prevail in software sector. Launched in 1993 by Science and Technology Development Advisor Board (CNPq), the program became a non-profit entity in 1997, which receives financial support from CNPq, FINEP, PNUD and BNDES. At first, the program had supported exports through trade promotion actions, but later it extended targeting for quality, management and technology improvement support as a way to increase competitiveness and exports growth. The program is decentralized, and counted, in 1999, 19 regional centers and 857 participant companies.

MDIC support has been centered in the increase of Brazilian exports, through engagement of SMEs to exporting effort. The MDIC programs intend to increase SMEs competitiveness through cooperation and financing as a way to leverage their foreign markets access. Naturally, this worry is explained by the necessity to minimize the external imbalance. Note that until few years ago Brazilian macroeconomic context did not stimulate export-drive. At first, the protectionism induced a focus on domestic market, and after that the country currency overvaluation reduced exports profitability. Both situations did not induce the sprouting of exports. However, with adoption of currency fluctuation, in 1999, that is, in a context of openness and competitive relative prices, the context changed.

In many situations an increase in trade depends upon product or technology development as a way to access markets or to address non-tariff import barriers. It is the typical case of extensive technical demands requested by buyer countries, which includes sanitary barriers for meats and fruits, labeling for grains and forest products, and airplanes homologation requirements. In these cases, technology and quality improvement and services provision means export promotion. As an example, MDIC, MCT, Ministry of Agriculture and Embrapa's local units are working together to help the accomplishment of foreign requirements in sanitary issues of northeast region fruits and flowers.

Through the Competitiveness Forum, MDIC has been trying to involve Brazilian production chains in initiatives that intend to foster productive relationship, technology, innovation and value adding. In the first phase, MDIC organized Forums of the following sectors: textile and clothing; chemicals; electronics; construction; shipbuilding; services, beauty products; leather and footwear; wood and furniture; automotive; agribusiness; and audiovisual.

SMEs exports effort support is conducted by Apex, a branch of national SEBRAE, in partnership with MDIC Foreign Trade Department (CAMEX) and regional SEBRAEs. Apex actions include creation of exports consortiums, trade promotion in international business fairs, market research,

trademark development and trade information. Apex finances a maximum of 50% of project' total cost. In 2002, the expenditures could reach R\$ 60 million. Apex have already participated in 100 projects, which had involved 50 private associations and had created around 60 exporting groups, with 15 companies in average each one. These groups mostly do not have legal existence are still doing trade promotion actions, not direct sales<sup>14</sup>.

The MDIC also had adopted measures to reduce bureaucracy and facilitate SMEs exports. Electronic drawback system, operating since 01/11/2001, must facilitate imports of inputs to be used in exported manufactured goods. The automatic transfer's liberation related to payment of exports up to US\$ 10.000 or 20% of export value is a measure that also helps SMEs.

Despite available programs had grown so quickly, SMEs access to these programs still faces many obstacles. Pinho, Cortes and Fernandes (2001) present the varied set of support programs for technology based SMEs and clearly shows that their effectiveness is low, because either lack of interaction or tough operational rules adopted by public agencies. The slowness, cost and bureaucracy of public sector move away small entrepreneurs. Bercovich (2001) says that Blumenau's software cluster didn't use available financial support to equipment acquisition and R&D activities: many SMEs even not try to use, and others try and do not obtain. This situation also occurs in Sao Jose dos Campos aeronautic and Belo Horizonte biotechnology clusters.

The alleged reasons involve mutual accusation. SMEs mention lack of information and skepticism about effective, simple and quick access to government agencies. Limited access is explained by few numbers of agencies in a big country, bureaucracy and high interest rates, inadequate maturity periods and guarantees demanded for loans concessions. In turn, agencies blame company's deficiencies (management and accounting) to explain the refusals.

Aware of these problems, federal government is taking steps to make possible SMEs access to these programs. To solve the problem of real guarantees required for loan concession two endorsement funds direct to micro and small entrepreneurs were created. Government expects that lender banks will be more receptive to SMEs that didn't have real guarantees. SEBRAE is operating Micro and Small Size Companies Endorsement Fund (FAMPE) since 1997 and BNDES created and regulated in 1998-1999 the Competitiveness Promotion Fund, for which federal government accomplish to honor up to 70% of the loans granted for BNDES for SMEs with monthly payment up to R\$ 60.000. The program has R\$ 300 million in resources and covers all types of loans, including export credits.

Also willing democratize credit access, MDIC requested three measures to BNDES in 1999: a) an increase from 60% to 80% in the endorsement fund covering, in order to stimulate private financing operations to SMEs; b) the dismissal of real guarantees in loans covered by the

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<sup>14</sup> Amongst the productive arrangements supported by Apex and SEBRAE state is Jaú's women footwear, Circuito das Aguas - MG/SP wool clothes and Brás and Bom Retiro - SP clothes. The partnership includes foreign markets prospection and participation in international fairs. Jaú footwear cluster' local private association have just created the trademark Brazil Essence, as well as did quality, technology and design improvements, with Apex R\$ 2 million support. Circuito das Aguas agglomeration also pursue companies' qualification and trade promotion, with Bank of Brazil and SENAI support. São Paulo city clothing cluster, after having started an export consortium, in February 2000, received an Apex R\$ 300.000 credit to participate in business fairs abroad.

endorsement fund up to R\$ 500.000 (that is, loans up to R\$ 625.000); c) the creation of local offices in states, which are being installed in states industry associations headquarters. The result of these measures has been impressive: loans to SMEs have grown 20 times since then. More recently, BNDES strengthened its financial power to support SMEs. In October of 2000 it launched a BNDESPar risk capital program focused in SMEs, with an R\$ 200 million budget. Finally, it is trying to catch US\$ 1 billion from World Bank in order to finance SMEs.

MCT policies have as strategic goal to stimulate technology through sprouting of new SMEs and new SMEs technology clusters, and connecting SMEs to research centers and universities. In that direction, government has worked to strengthen the effectiveness of national R&D system, particularly in the less developed regions of the country. In order to sprout new productive arrangements, MCT has supported companies' incubators through National Program of Support to Companies Incubators (PNI), which had begun in 1998. In addition, by means of FINEP, the Venture Brazil program was created. Its objective is to connect researchers, inventors, small technology companies and risk capital investors.

Trying to increase private investments in technology and innovation, MCT created a new regulation in 1999 - the sectors funds. For Mendonça and Botelho (2001), sector funds must facilitate university – private sector cooperation, over all through simpler institutional rules to provide private resources for universities' infrastructure and research centers. Have already been approved 14 sector funds, and FINEP handle them<sup>15</sup>. The resources managed by these funds had increased from R\$ 180 million in 2000, first year of operation, to R\$ 450 million in 2001. In 2002, with the starting of four new ones, the funds should allocate R\$ 1 billion. MCT has a specific process to select projects to be supported, which includes meetings with local agents, universities, research centers, state governments, banks and development agencies.

To deal with technological bottlenecks of national clusters, MCT created and incorporated some credit and technology support programs. In December 2000, MCT incorporated Technological Support for Exports Program (Progex), which is focused in SMEs with less than 100 employees and finances technological adaptation of products needed to fit requirements of foreign markets. The process includes packing, design, labels, certification and technical standards. The program was launched in January 1999 in São Paulo, as a partnership between IPT and local SEBRAE. After incorporation, became national wideness and now count on support by MCT and MDIC<sup>16</sup>. The outcomes of São Paulo phase were excellent: companies included had multiplied for 10 times its exports. National Progex have already started where state technological entities signed deals<sup>17</sup>. The goal is to increase adequacies from 65 a year to 2.000 a year.

Finally, MCT sent to legislative branch the so called Law of Technological Innovations. Through the law government wish to link technological innovation created inside public research centers,

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<sup>15</sup> National Scientific and Technologic Development Fund (FNDCT), Oil and Gas (CTPetro), Infra Structure, Transport, Energy, Telecommunications (Funtel), Water Resources, Mining, Health, Biotechnology, Agribusiness, Information Technology, Aeronautic Sector and Verde Amarelo Fund, that wants to foster university – private sector interaction, through financing innovation of private companies connect in a cluster, besides lower interests rates in FINEP's R&D financing funds.

<sup>16</sup> Through FINEP, Verde Amarelo Fund and CAMEX

<sup>17</sup> IPT in São Paulo; INT in Rio de Janeiro; Cetec in Minas Gerais; Tecpar in the Paraná; and Itepar in Pernambuco.

such as Embrapa and Fiocruz, to private companies that want to build a business related to this innovation, by means of royalties' payments.

### 3.2. Local Government Economic Support for SMEs

States and cities also have been adding and improving programs to support productive clusters. But these programs are still very asymmetric in the length of their advance in each state or municipality. Local governments, in general, have been adopting two strategical actions: a) support to the emerging of new productive agglomerations: taxes incentives and land concession, and structuring of incubators, industrial and tech parks, and venture capital funds for emergent IT companies; b) support to productive arrangements evolution: partnerships with private enterprise entities and universities for creation and improvement of research and training centers, and development of financing instruments, as microcredit.

Local government wants to attract and keep companies. States offer ICMS exemption and cities grant local taxes exemptions (ISS, IPTU and ITBI). Also they offer land and commitment with infrastructure improvements. In addition, local governments pled to federal custom agency to simplify procedures to make easier clusters' components imports<sup>18</sup>. Its worth to mention Rio Grande do Sul and Santa Catarina states governments programs of ICMS incentives offered to companies to avoid plants transfers to Northeast, or to induce the return of these plants. Rio Grande do Sul granted a 75% discount in ICMS per eight years, while Santa Catarina launched the Textile Prodec in 1997, focused in Vale do Itajaí textile and clothes companies.

Many initiatives have been taken in local scope. Campinas - SP is a good example: in December 1995, the municipality launched the Program for Industries Attraction (Promai), which offers to high technology companies' total exemption of IPTU from the land purchase until the start-up, and 50% reduction in ITBI and ISS.

Support to new SMEs also is provided. Santa Catarina, Rio de Janeiro and São Paulo have investments funds focused in technology companies. SPTEC, a fund created in São Paulo, is a partnership between local SEBRAE, BNDESPar, Cisneros Group and other private companies, and intends to allocate R\$ 24 million in 25 companies in 3 years, giving amounts up to R\$ 1.5 million. Another kind of support program is the Clothing Industry Job Program launched also in São Paulo, through a deal with Abit, Abravest and CDL. It offer to people enrolled in training courses equipment financing and consulting, with the final goal to transform them in small entrepreneurs that could be contracted by the bigger companies.

There is an extensive list of examples of local entities and universities support to SMEs and clusters. It is enough to mention São Paulo SEBRAE work. One example is the local initiative launched in early nineties by SEBRAE and São Paulo University (USP), in partnership with

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<sup>18</sup> As examples, Mato Grosso state government launched Incentive Program to Cotton Crops (Proalmat), which offer benefits to cotton producers as a mean to leverage production. More recently, Proalmat-Indústria was launched. It stipulates 80% ICMS reduction for weaving and 85% for clothing, which are added to income federal tax exemption offered in SUDAM area. Goiânia and Anápolis - GO chemical manufacturers cluster also shows high growth, stimulated by generic drugs production, strongly supported by Goiás government, that financed a bio equivalence laboratory (similarity of active principle tests) and gave heavy tax incentives.

enterprise associations and research centers, called Enterprise Modernization for Collective Efficiency, to strengthen SMEs cooperation nets. The participant companies of many São Paulo clusters had been stimulated to identify common problems and develop cooperative actions<sup>19</sup>.

São Paulo SEBRAE continues to launch new initiatives. Through project Small Companies Condominium (CEPE), the entity intends to form 100 industrial condominiums in inland regions. In Sao Bernardo do Campo furniture cluster, a set of SMEs shares easy manufacturing and furniture design development, exchange information and discuss common problems, all this supported by SEBRAE, through Movelação program - Design Connection Exportation, and by USP, with Dials Technology program. Alto Tietê farm producers organized a partnership with SEBRAE, Ceagesp, state government and municipal governments to improve production, products conservation, packing standards, and trade. Finally, the Project of Mobile Units for Technological Attendance to Micron and Small Size Companies (Plummet), a partnership SEBRAE, IPT, National Institute of Plastic (INP) and FAPESP, directed to ABC region plastic transforming, which providers to producers two vans with laboratories and specialists of IPT and INP for quality improvement solutions.

Local cooperation is not restricted to São Paulo state. It can be seen all around the country. In Lagoa - PE, by means of state and municipal governments, Valexport and Embrapa partnership, was created the Technological Center of Grapes and Wine. In the south side of the country, in Rio Grande do Sul, state government supports a group of poultry farmers of Caxias, Garibaldi and Sao Sebastião do Caí to form an export consortium that could allow them to foster participation in business fairs, marketing effort, foreign markets access and trademarks.

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<sup>19</sup> The project reached 615 companies of 9 regions, including Americana textile and clothes industry; Jaú footwear; Votuporanga furniture; Itú ceramics; Cândido Mota cassava products; and Sao Jose do Rio Preto clothes. In 1993 and 1994 8 new regions were included: Ribeirão Preto printing; Franca honey; Jardinópolis and Porto Ferreira ceramics; Piedade onion farmers; Ibitinga embroidering; Presidente Prudente truckers; and Itatiba furniture. Real results of joint actions had been the creation of Mechanics Workshop and Technique Library, in Americana; EXPOCAL (Footwear Fair) in Jaú; and wood dryer project in Votuporanga.

## **Final Remarks**

Public policies focused in SMEs, in innovation and entrepreneurship, in local productive clusters and in SMEs relationship within the cluster had reached greater relevance in Brazil in recent years. This approach seems to be extremely relevant and adjusted to enhance competitiveness in a country like Brazil, marked by big size, diversified production activities and resources, huge unemployment, social and regional inequalities and federative organization of public sector. It is worthy also as a way to connect private and public efforts, that is, of local and sectoral private entities and of national and local governments. Besides, it is important because has international legitimacy, for being acceptable for WTO rules and supported by multilateral programs.

SMEs clustering could be a key factor to foster externalities, synergies, collective efficiency gains, innovation, export-drive growth and by this means increase employment, productivity, added value and regional development. SMEs linked could minimize their competitive disadvantage in terms of lower scale of production and distribution and, at the end, could play a significant role in breaking barriers to growth and development. The challenge is hard, considering the rhythm of technological progress and coordination failures, but extremely necessary, considering the enormous Brazilian external imbalance and vulnerability.

This approach is very promising. Brazil' sectoral and geographic specialization is deeper now, since economic liberalization pushed the country to their comparative advantages. Traditional sectors based on labor or natural resources, such as fruit, leather and footwear, textiles and clothes, minerals, furniture and wood and extraction of natural products, shows many cases in which SMEs had worked together in issues like quality improvement in supply chains, information access, equipment time-sharing, labor training and market access, specially foreign markets.

Private joint initiatives and public policies launched recently focus SMEs cooperation and collective efficiency through technology and design centers, labor training agencies, export consortiums and export promotion actions. Public financing schedules had been created and changed in a way to offer easier access to SMEs and clusters. Indeed, public policies related to SMEs have been changing from individual and isolated company support to SMEs productive clusters support.

But in an historical and evolutionary perspective, we could say that Brazilian SMEs clusters have not reached the most advanced and complex levels of development in terms of higher interaction and cooperation and increasing collective efficiency. They certainly could do more. SMEs interactions still are very asymmetrical and relatively restricted in terms of actors, sectors and contents. There is still much to be achieved in issues like technology and innovation, especially horizontal relationship in high technology sectors. Institutional environment should and could advance in order to emergent clusters become mature and advanced clusters.

To reinforce SMEs entrepreneurs' ties in a private approach, in our understanding, the first step is an effort to join these companies in local and sector representative private associations. But public agencies could have a very important catalytic role. SEBRAE, as a public-private organization, could disseminate the successful historical clustering examples and experiences

showed here and also strengthen awareness in concepts like clusters, industrial districts, tech parks, partnership, cooperation and collective efficiency. Besides, private associations could offer more services to SMEs and as SMEs recognize the benefits of joint work in these institutions, greater will be confidence and cooperation.

A second step is to foster SMEs competitiveness, market access, R&D and innovation, through vertical and horizontal cooperation with each other and with public agencies. The attraction of suppliers could reduce costs, and more specialization in productive chain could raise efficiency and productivity. Better financial and technical public support and better infrastructure also seems to be crucial. For example, public infrastructure and stronger support to R&D could foster SMEs' R&D; transport modals or specialized port terminal may extend scales and guarantee regularity.

Many public policies related to SMEs have just been started. Yet isn't possible to evaluate properly its outcomes in this initial phase, these policies seems to be successful. We have seen some good results in credit and exports support, but these successful policies are not spread enough because of scarcity of resources. Other policies still are less effective but could improve by solving operational deficiencies and legal framework restraints.

In such a way, local governments could promote productive arrangements by creation of new local scope SMEs support policies and by helping SMEs to better use the federal government programs already launched. The first case could involve incubators, labor training centers and technical support centers. The second case would involve since helping SMEs to access available federal financing instruments through endorsement funds, to local agencies support to SMEs in the accomplishment of federal agencies requirements, like product standards, certifications and licensing patents and property rights.

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## List of Acronyms

ABC – Region of Santo André, São Bernardo and São Caetano  
ABPM – Associação Brasileira dos Produtores de Maça – Brazilian Apple Producers Association  
AIAB – Associação das Indústrias Aeroespaciais Brasileiras – Brazilian Aerospace Industries Association  
AMPE – Programa de Apoio à Micro e Pequena Empresa do MCT – Micro and Small Enterprise Support Program  
ANPEI – Associação Nacional de Pesquisa e Desenvolvimento das Empresas Industriais – R&D Association  
ANPROTEC – Associação de Entidades Promotoras de Empreendimentos de Tecnologia Avançada – Advanced Technology Promoting Entities Association  
Apex – Agência de Promoção de Exportações – Agency for the Promotion of Exports  
BACEN – Banco Central do Brasil – Brazilian Central Bank  
Blusoft – Blumenau Polo de Software  
BNDES – Banco Nacional de Desenvolvimento Econômico e Social – Brazilian Development Bank  
BNDESPAR – BNDES Participações – BNDES Equity  
CEAG – Centros de Apoio Gerencial – Managerial Support Centers  
CEBRAE – Centro Brasileiro de Assistência à Pequena e Média Empresa – Small and Medium Size Enterprises Brazilian Support Center  
CEF – Caixa Econômica Federal – Federal Saving Bank  
CERTI – Fundação Centro Regional de Tecnologia em Informática – Regional Center of Technology in Computer Science Foundation  
CIATEC – Companhia de Desenvolvimento do Pólo de Alta Tecnologia de Campinas – Campinas Company of Technology Development  
CODEFAT – Conselho Deliberativo do Fundo de Amparo ao Trabalhador – Workers Supporting Fund Board  
COPPE/UFRJ – Coordenação de Pós-graduação em Engenharias da Universidade Federal do Rio de Janeiro – Engineering's Graduate Center of Rio de Janeiro Federal University  
CNI – Confederação Nacional da Indústria – National Confederation of Industries  
CNPq – Conselho Nacional de Desenvolvimento Científico e Tecnológico National – Science and Technology Development Advisor Board  
CONTEC – Consórcio de Capitalização de Empresas de Base Tecnológica – Technology Equity Fund  
DEMPI – Departamento da Micro e Pequena Indústria da FIESP – Micro and Small Industry Companies Dept  
ECLAC – Economic Commission for Latin America and Caribbean – Comissão Econômica para América Latina e Caribe  
EMBRAPA – Empresa Brasileira de Pesquisa Agropecuária – Brazilian Farming Research Center  
Epagri – Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina – Santa Catarina Farming Research Center  
ETE – Escola Técnica de Eletrônica Francisco Moreira da Costa – Francisco Moreira da Costa Electronics School

FAI – Faculdade de Administração e Informática – Business and Computer Science College

FAMPE – Fundo de Aval às Micro e Pequenas Empresas – Micro and Small Size Companies Endorsement Fund

FAPERGS – Fundação de Amparo à Pesquisa do Estado do Rio Grande do Sul – Rio Grande do Sul Research Support Foundation

FAPESP – Fundação de Amparo à Pesquisa do Estado de São Paulo – São Paulo Research Support Foundation

FAT – Fundo de Amparo ao Trabalhador – Workers Supporting Fund

FIEMG – Federação das Indústrias do Estado de Minas Gerais – Minas Gerais Industries Association

FIESP – Federação das Indústrias do Estado de São Paulo – São Paulo Industries Association

FINEP – Financiadora de Estudos e Projetos – Technological Projects Financing Agency

FIPEME – Programa de Financiamento à Pequena e Média Empresa – Small and Medium Size Companies Financing Program

FNDCT – Fundo Nacional de Desenvolvimento Científico e Tecnológico – National Science and Technology Fund

ICMS – Imposto sobre Circulação de Mercadorias e Serviços – Goods and Services Tax

IDB – Inter-American Bank

IDS – Institute of Development Studies - Sussex

Inatel – Instituto Nacional de Telecomunicações – Telecommunications National Institute

INP – Instituto Nacional do Plástico – Plastic National Institute

IPEA – Instituto de Pesquisa Econômica Aplicada – Economic Applied Research Institute

IPT – Instituto de Pesquisas Tecnológicas – Technological Research Institute

IPTU – Imposto Predial e Territorial Urbano – Urban Territory Tax

ISS – Imposto sobre Serviços – Service Tax

ITBI – Imposto sobre Transmissão de Bens Imóveis – Real Estate Inherit Tax

JICA – Japan International Corporation Agency

MCT – Ministério da Ciência e Tecnologia – Science and Technology Ministry

MDIC – Ministério do Desenvolvimento, Indústria e Comércio Exterior – Development, Industry and Commerce Ministry

MSME – Micro, Small and Medium Size Enterprises

PADCT – Programa de Apoio ao Desenvolvimento Científico e Tecnológico – Scientific and Technological Development Support Program

PATME – Programa de Apoio Tecnológico às Micro e Pequenas Empresas – Technological Support to Micro and Small Companies Program

PBQP – Programa Brasileiro de Qualidade e Produtividade – Quality and Productivity Brazilian Program

PCI – Programa de Competitividade Industrial – Industrial Competitiveness Program

PEE – Programa Especial de Exportações – Exportation Program

PICE – Política Industrial e de Comércio Exterior – Industrial and Foreign Trade Policy

PIPE – Programa Inovação Tecnológica em Pequenas Empresas – Innovation in Small Companies Program

PNI – Programa Nacional de Apoio às Incubadoras de Empresas National – Incubators Support Program

PROGEX – Programa de Apoio Tecnológico à Exportação – Technological Support for Exportation Program  
PROGIRO – Programa de Financiamento de Capital de Giro – Working Capital Financing Program  
RAIS – Relatório Anual de Informações Sociais – Social Information Annual Report  
RHAE – Programa de Capacitação de Recursos Humanos para Atividades Estratégicas – Financial Support for High Skill Researchers  
SEBRAE – Serviço Brasileiro de Apoio à Micro e Pequena Empresa – Brazilian Microenterprise and Small Business Support Service  
SENAI – Serviço Nacional da Indústria – National Industrial Training Service  
SEPLAN – Secretaria de Planejamento da Presidência da República – Federal Planning Secretariat  
SIMPLES – Sistema Integrado de Pagamento de Impostos e Contribuições das Microempresas e Empresas de Pequeno Porte – Tax Payment System for Micro and Small Businesses  
SME – Small and Medium Size Enterprises  
Softex – Programa Nacional de Software para Exportação – National Program for Exporting Software  
TJLP – Taxa de Juros de Longo Prazo – Long Term Interest Rate  
UFIR – Unidade Fiscal de Referência – Fiscal Unit of Indexation  
UFMG – Universidade Federal de Minas Gerais Federal – Minas Gerais University  
UFSC – Universidade Federal de Santa Catarina Federal – Santa Catarina University  
UFSCar – Universidade Federal de São Carlos – São Carlos University  
USP – Universidade de São Paulo – São Paulo University  
WTO – World Trade Organization

## Annex 1 - Panel of Productive Clusters in Brazil

Origin	Format	Sectors	Specialization	Region	States		
Natural Resources	Industrial District	Shoes / Leather	Feminine	Vale dos Sinos	RS		
		Ceramic		Criciúma / Tubarão	SC		
	Agglomeration	Shoes / Leather	Masculine	Feminine	Franca	SP	
					Jaú	SP	
			Birigui	SP			
			Nova Serrana	MG			
			Campina Grande / Patos	PB			
		Textiles	Weaving	Cotton / Sheet / Towels	Clothes	Americana / Nova Odessa / Santa Barbara / Sumaré	SP
						Vale do Itajaí / Blumenau	SC
			Wool Clothes	Hosiery	São Paulo	SP	
					Jacutinga / Monte Sião / Aguas de Lindóia / Lindóia / Serra Negra	MG / SP	
			Artisan Clothes	Clothes	Nova Friburgo / Lambari / Bom Jardim / Duas Barras / Cantagalo	RJ	
					Tobias Barreto	SE	
				Colatina	ES		
		Toys			Laranjal Paulista	SP	
Chemical	Plastics	Plastics	ABC	SP			
			Triunfo	RS			
Furniture			Bento Gonçalves / Caxias / Flores da Cunha	RS			
			Sao Bento do Sul / Campo Alegre / Rio Negrinho	SC			
			Arapongas	PR			
			ABC	SP			
			Votuporanga / Mirassol	SP			
			Paragominas	PA			
			Linhares	ES			
Ceramic			Ubá / Juiz de Fora	MG			
			Rio Claro	SP			
Food - Meats		Bovine / Porks / Poultry	Poultry	Uberaba / Uberlândia	MG		
			Porks	Caxias / Sao Sebastião Caí	RS		
			Bovine / Porks / Poultry	West Region	SC		
			Shrimps	Rio Verde	GO		
			Shrimps	Timbau do Sul	RN / CE		
Food - Dairy			Sao Francisco River	BA			
			South Region / Pocos de Caldas / Pouso Alegre	MG			
			Vale do Paraíba	SP			
			Saint Inácio	PR			
			Itumbiara	GO			
Food – Beverages		Wine / Grapes	Itaperuna / Conceição de Macabu	RJ			
			Wine / Grapes	Serra Gaucha	RS		
			Tea	Lagoa Santa / Santa Maria	PE / BA		
			Central Region	SC			

			Tea Cachaca	Registro / Pariqueraçu Salinas	SP MG
		Foods - Fruits	Pineapple Pineapple Acerola / Cantaloupe / Manga	Miracema Itaberaba Lagoa Santa / Juazeiro / Santa Maria / Vale do Açú / Mossoró / Itaiçaba	TO BA RN / CE
			Vegetables / Fruits Papaya Apple / Pear Apple / Pear Tobacco Leaves	Mogi / Salesópolis North Region Fraiburgo / S. Joaquin / Urupema Vacaria Santa Cruz do Sul / Vera Cruz / Venancio Aires	SP ES SC RS RS
		Forest Products	Eucalyptus Pulp Paper Pulp Paper	Mogi / Salesópolis Canoinhas / Curitiba / Lages Guarapuava	SP SC PR
		Flowers	Tulips Orchids	Holambra Vale do Paraíba	SP SP
		Mineral	Gypsum Rocks / Stonecutting Jewels	Araripina Gov. Valadares / Teófilo Otoni Limeira Guaporé	PE MG SP RS
		Tourism	Eco Tourism Eco Tourism Coast Coast Coast Coast Coast	Bonito / Bodoquena Amazonian Fortaleza Coqueirais Salvador Porto Seguro Rio de Janeiro Florianópolis	MS AM CE PE AL BA BA RJ SC
Tax Incentives			Pharmaceuticals Cotton / Textile	Goiânia / Anapólis Rondonópolis / Campos Verdes / Primavera do Leste / Itiquira	GO MT
Investment in Education and R&D	Technolog y Parks / Incubators	IT	Hardware / Software Hardware / Software  Software Software	Campinas Santa Rita do Sapucaí / Itajubá / Pouso Alegre Blumenau Florianópolis	SP MG  SC SC
		Biotechnology	Human Products	Belo Horizonte / Montes Claros	MG
		Mechanics	New Material Optical Products	Sao Carlos Sao Carlos	SP SP
Attraction / Creation of Leader Companies	Productive Chains – Contracting Nets	Mechanics	Auto Parts / Metallurgy Auto Parts Auto Parts Auto Parts Auto Parts Motors Aeronautic	ABC  Vale do Paraíba Belo Horizonte Curitiba Porto Alegre Joinville Sao Jose dos Campos	SP  SP MG PR RS SC SP

Traditional industry = shoes, not metallic minerals, leathers, textiles, food, beverages, tobacco, furniture

Primary goods = agriculture, flowers, fish, wood, rocks.

Source: BRITTO (2000); BRITTO and ALBUQUERQUE (2001); SUZIGAN, FURTADO, GARCIA and SAMPAIO (2000); and sites [www.redecluster.org.br](http://www.redecluster.org.br) and [www.ipea.gov.br/polind](http://www.ipea.gov.br/polind).