

**Subnational Government and Policy Challenges  
in Brazil's Information Technology Sector**

**TRACK: The Role of the State and State Owned  
Enterprises in the development of business**

**Keywords: Brazil, clusters, information technology**

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**Abstract**

The growth and expansion of Brazil's IT sector during the last decade has been remarkable, bringing both challenges and opportunities to small and medium-size firms (SMEs). Focusing on the high technology cluster in São Paulo State—the municipality of Campinas, in particular—a qualitative research study examined the role of governmental institutions and their interaction with business and academe to foster competitiveness. The researchers found that despite many competitive assets, governmental policies (or lack of sound ones) hinder SMEs in the high-tech sector. Fifteen specific actions by the public and private sector to are proposed to improve the competitiveness.

## **OVERVIEW**

The growth and expansion of Brazil's IT sector during the last decade has been remarkable, bringing both challenges and opportunities to small and medium-size firms (SMEs). Focusing on the high technology cluster in São Paulo State—the municipality of Campinas, in particular—a qualitative research study examined the role of governmental institutions and their interaction with business and academe to foster competitiveness. The researchers found that despite many competitive assets, governmental policies (or lack of sound ones) hinder SMEs in the high-tech sector. Fifteen specific actions by the public and private sector to are proposed to improve the competitiveness.

## **THEORETICAL, PRACTICAL AND POLICY SIGNIFICANCE**

As subnational governments and local private sector organizations strive to compete in a rapidly globalizing world, clustering and networking emerge as key strategic factors in raising competitiveness, especially among small and medium-sized enterprises (Humphrey and Schmitz 1995). The experiences of the United Nations Industrial Development Corporation (UNIDO), as well as regional, state-level, and local development organizations demonstrate that the role of regional and local government as well as joint public/private initiatives are critical to success (Ceglie and Dini, 1999).

### ***Small and Medium-Size Enterprises***

The new economy poses daunting challenges for SMEs. Whether based in developing or industrialized nations, these enterprises must rapidly adapt to survive, let alone thrive, as globalization—including trade, investment, and financial liberalization—bring relentless pressure upon them. To achieve the multiple benefits of agglomeration, large companies and their suppliers—many SMEs—are increasingly migrating to industry specific clusters.

Examining SME competitiveness and the role of clusters and value chains, Haar and Meyer-Stamer (2008) found that contrary to common belief, smallness can be a virtue, and the new global economy also presents notable opportunities for SMEs. To begin with, technology is the great “leveler”—accessible and generally affordable to firms of all sizes across a wide spectrum of industries. Additionally, smallness allows SMEs greater flexibility, latitude, and speed in responding to both threats and opportunities. For *entrepreneurial* SMEs from developing or industrialized nations, a globalizing business environment and the continuation of market liberalizing and reform measures aimed at their domestic business environment will provide more benefits than costs.

### ***The Case of Brazil and the IT Sector***

Brazil provides a case example for studying SMEs and cluster competitiveness. Besides the sheer size of the Brazilian economy (the 6th largest in the world), it is an emerging market that has attained macroeconomic consolidation, including a stable foreign exchange market, reduced sovereign credit risk, and manageable inflation. It has achieved progress in fiscal affairs (witness its Fiscal Responsibility Law), posts strong export performance, investor confidence and a continuing pattern of reform of its institutions, including administrative and judicial procedures.

#### **Why the Information Technology Cluster?**

Although Brazilian commodity exports have grown significantly during the past decade, manufactured goods remain the nation’s dominant export (e.g., 75% of Brazilian exports to the U.S. are manufactured goods).

The software industry, one of the most vibrant “arms” of the Brazilian IT industry, is quite relevant in global terms, with revenues over US\$ 10 billion and annual growth of 11% on average. The IT cluster of Campinas, located in the state of São Paulo, is perhaps the best illustration of this situation.

## **Why São Paulo State and Campinas?**

The state and local government have played a major role in strengthening the competitive environment for SMEs located in Arranjos Produtivos Locais (APLs) [Local Productive Arrangements—a euphemism for “clusters”], so that they can expand their markets globally.

The telecommunications cluster of Campinas, the second largest city of the state of São Paulo, is the biggest agglomeration of this sector in Brazil. While companies like IBM, Hewlett-Packard, Lucent and Motorola have production units in the city of Campinas, they have spawned hundreds of technology-based SMEs.

Much of the success of this cluster, however, comes from the excellent universities and research centers based in Campinas. UNICAMP (The State University of Campinas), founded in 1996, is consistently ranked among the top universities of Brazil.

Another key supporting institution is CPqD, a huge research center founded in 1976 by Telebrás, the former State-owned telecommunications monopoly.

Campinas is also the headquarters of SOFTEX<sup>1</sup>, a non-governmental organization whose objective is to foster the export of Brazilian software. SOFTEX agents support software companies all over Brazil, working together with private and public sectors (government, universities, research centres) in all their levels.

## **Federal Support Mechanisms**

Although cluster development remains largely within the purview of state and local government, federal support mechanisms can play a significant supportive role.

Incentives to the development of APLs are widely focused on supporting SMEs located in agglomerations.

The federal government, for instance, recently added the APLs to the national industrial policy agenda,

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<sup>1</sup> Portuguese acronym for Brazilian Society for the Promotion of Software Exportation. For more information, visit SOFTEX website: <http://www.softex.br>

aiming not only to increase the competitiveness of the small and medium-sized enterprises, but also to increase the share of these firms in Brazilian foreign trade. (Otoni, 2004).

SEBRAE ([www.sebrae.com.br](http://www.sebrae.com.br)), a non-profit organization that receives significant support from the federal government, is very active in APLs policies and activities.

Most important, however, has been BNDES (Banco Nacional de Desenvolvimento Econômico e Social)—an entity that has been in the vanguard of national economic development. Finally, the Brazilian congress passed a Law of Innovation (2004) to spur technological development.

## **RESEARCH METHODOLOGY**

The proposed methodology and work plan were designed to answer the critically important research questions. In terms of research design, the research team first collected information about 700 potential companies among local institutions (unions, associations, commercial registry, etc.). After a selection process in which these companies' size, economic activity and location were analyzed, around 250 new economy SMEs became the primary option of our study. These companies' activities comprised the information technology, telecommunications, and biotechnology sectors.

The three major lines of inquiry that comprise the proposed study were:

**(1) What are the federal and state-level policies and practices that advance (and impede) cluster competitiveness? I**

**(2) What are the firm-level operations and actions SMEs can take to boost their competitiveness within clusters?**

**(3) What specific measures can federal and state governmental institutions implement to support SMEs in high value-added clusters?**

An online questionnaire consisting of twenty-five questions was administered to 250 SMEs selected for the study. Completed questionnaires tallied 58, a 23 percent response rate of usable questionnaires

Interviews followed the survey stage. In addition to new economy SMEs, this next stage in field research included several other actors that play a fundamental role in the cluster's future: research institutes, associations, incubators, local administration, research agencies and the leading university (UNICAMP).

**RESEARCH RESULTS**

The following analysis is a consensus account of personal interviews with over 50 people related to the new economy sector (companies, associations, incubators, research agencies, local administration. This "supplement" the questionnaire analysis actually provided a richer perspective about actions of public sector officials in fostering/impeding the development of new economy SMEs in the region.

*Tax Burden*

The high tax burden imposed by governmental levels in Brazil is a problem common to all people and companies. This is no different in the new economy sector. Two major laws aimed at providing tax benefits to the IT sector (Lei da Inovação and Simples Nacional) were not widely broadcast; and even those who did not about these laws did not find them particularly helpful.

One of the interviewees, the president of an IT association that represent 70% of the sector's GDP, reports that informality is massive in the sector-- around 50%; and that the reason for this high percentage of informality is attributed to taxes..

### *The Excellent Local Infrastructure*

Campinas is considered the fifth best Brazilian city in urban infrastructure. However, this “competitive advantage” cannot solve some problems faced by local entrepreneurs. Frequent power interruptions and the high price, quality and instability of broadband internet were also cited as major obstacles.

### *Fostering Innovation Through Research Agencies*

Federal and State research play an important role for many new economy companies located in Campinas. Companies turn to research agencies frequently, given the amount of projects approved.

Despite the fundamental role of research agencies, complaints among interviewees abound. Bureaucracy is commonplace among interviewees—especially the excessive paperwork requirements according to many.

The majority of complaints, however, are directed to FAPESP, the state research agency. Interviewees claim that criteria to approve/reject projects are unclear, and projects are never approved if it is not headed by a university professor, suggesting that support for research only comes if an entrepreneur is tied into the academic network.

Interviewees also complain about bias towards academe in analyzing research projects. For the successful, once approved, some interviewees had to deal with another issue. When funds granted by research agencies, the money does not arrive regularly or on demand.

### *Access to Credit*

The majority of interviewees take a position they define as “conservative”, which means not getting loans from banks. The reason is simple---the high interest rates of Brazilian financial institutions.

BNDES, a federal bank to foster productive investments, is the only relevant player in financing Brazilian productive investments that are national in scope. However, the minimum amount a company must request is R\$ 1,000,000---too much money for the needs of some SMEs.

#### *Workforce Availability*

All interviewees and questionnaire respondents, without exception, praised the qualification of the local workforce, thanks to the excellent educational system of Campinas.

Despite the general satisfaction with the local workforce, some interviewees stressed that the local workforce is facing two challenging issues: (1) it is no longer abundant; and (2) employees lack some specific skills. For instance, Foxconn, a Taiwanese electronics company, had to postpone the launch of Apple's iPad production twice. The reason: its plant in Jundiaí, a city a few miles away from Campinas, was able to hire only 127 of the 400 engineers needed to run the plant.

#### *Fostering Innovation Through Research Institutes*

Campinas has over 20 research institutes located in the city, the majority of them dedicated to IT, telecom and biotech sectors. This is an enviable number for any city in the world. The relationship between these institutes – the majority being run by the state or federal government – and SMEs is, however, minimal.

One incredible illustration of this situation is CNPEM<sup>2</sup> (the acronym for National Center for Energy and Materials Research). But lab directors interviewed stated uniformly most local SMEs do not know they exist.

#### *Managerial Support for Companies*

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<sup>2</sup> For more information about CNPEM, see <http://www.cnpem.org.br/>

Many directors and owners of companies interviewed are entrepreneurs with much technical expertise but without any experience in operating a business. Therefore, managerial support is paramount for the survival of these companies.

In Brazil, SEBRAE, an institution created by the federal administration to support exclusively small and medium enterprises, plays an important role in transferring to entrepreneurs the bundle of managerial techniques needed to run a new business. Local entrepreneurs interviewed stress the importance of SEBRAE for their companies.

#### *Making Market Introduction Happen*

Interviews with new economy companies exposed a problem which is not usually addressed by governmental spheres: the market introduction of products/services produced by these companies. Interviewees reported many cases in which innovations (some of these funded by research agencies) were not introduced to market because there were no funds dedicated to this.

#### *The (Lack of) Coordination Among Public Sector Actors*

Interviews with agents of the public sector at all governmental levels made clear that local, state and federal administration have implemented policies and actions that might help the development of new economy SMEs in Campinas and in all cities belonging to its Metropolitan Region. However, these policies and actions are not necessarily oriented specifically to the needs of SMEs in the region, since they are designed to be national in scope.

The lack of a “macro policy” in Metropolitan Campinas impedes cooperation and leads to cut-throat competition for attracting new companies through a series of tax incentives or land donations. Some SME

interviewees report they were “invited” by representatives of these neighboring cities to launch or move their companies there.

#### *The Communication Problem*

This absence of coordination might be in part the cause of another problem that was gradually exposed during field research. Interviewees, especially those of SMEs, seldom knew what the public sector had been doing on their behalf, in terms of tax benefits, loans, trade missions, and other opportunities. Since interaction among public and private entities is scarce, some interviewees claim that public sector, mainly local administration, is completely absent in terms of support for SMEs.

### **3 – PROPOSED ACTIONS SMEs CAN TAKE TO BOOST THEIR COMPETITIVENESS**

#### *Overcome the barriers of sector diversity and isolation*

SMEs reported that local entrepreneurs barely exchange information about the situation of their businesses. Interviewees believe that this “isolation” of SMEs plays a fundamental role in retarding local development.

The solution for this general lack of interaction among local SMEs can be found in local associations that have been created by entrepreneurs in the last years such as “Campinas Startups<sup>3</sup>”, a young association founded by local SMEs. More associations should be created, and local entrepreneurs should use all available media to foster this needed interaction.

#### *Associate or Cooperate with Business Experts*

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<sup>3</sup> Website of Campinas Startups: <http://www.campinasstartups.com.br/>

Some interviewees claimed that one of the main barriers to the development of a new economy SME is the lack of expertise in managing a business. Many of these entrepreneurs received their college degree in engineering or information technology, with little or no management training following graduation.

Incubators do an excellent job in providing entrepreneurs with business expertise. Although many do exist, there are not enough to satisfy the needs of many potential new businesses. One solution, proposed by one of the interviewees, is the creation of private incubators. Currently none exists in the Metropolitan Region of Campinas where all local incubators are connected to the public sector.

SMEs should also tap the entire networked institutional support available in the region. Despite many SME complaints about SEBRAE's support as "too basic," many new-born SMEs do not even have the minimum expertise to run a business.

#### *Share Experiences with Universities and Research Centers*

Despite the fact that many SMEs entrepreneurs have been supported by local universities and research centers, there is no interest in sharing their experiences with people belonging to these institutions, meaning students, professors and researchers.

#### *Go global*

Many SMEs interviewed in the course of the field research have quality products or services that could be easily accepted by foreign markets. However, they still keep their eyes on the Brazilian or on the regional market. This dependence makes SMEs vulnerable to the fluctuations of the regional economy and also constrains their ability to access potential markets for their products or services.

Some interviewees found their way to export their products or services, and attend international trade fairs. Partnerships with international universities and joint ventures with international companies were the solution found by some new economy SMEs to globalize their markets.

## **SPECIFIC MEASURES GOVERNMENTAL INSTITUTIONS CAN TAKE TO SUPPORT SMEs IN HIGH VALUE-ADDED CLUSTERS**

### *Establish a Governance Structure*

None of the three governmental levels has a plan, strategy or mega-project for the development of Campinas as a high value-added cluster. The public sector (federal, state and local) should establish a new governance structure for Campinas, in order to implement effective policies, incentives and initiatives to region.

### *Establish a Communication Channel with SMEs*

Local administration should be responsible for informing clearly and in a pragmatic way all the incentives, benefits, and initiatives of all three governmental levels. A website capable of consolidating all this information could be considered a reference for all new economy entrepreneurs.

### *Grant SMEs Access to Research Centers at Affordable Prices*

The great number of research centers in Campinas provides local SMEs opportunities to innovate and improve the quality of their products. The use of these centers' infrastructure is, however, costly. The public sector, which runs most of these centers, should lower the prices for SMEs.

### *Provide Capital for Market Introduction*

Local SMEs lack the money needed to introduce their products/services in the market, through trade fairs, marketing campaigns, etc. Federal institutions such as BNDES, and also state and local administrations, should provide money to finance the market introduction of innovations that SMEs produce..

#### *Qualify People According to SMEs Needs*

The public sector must be aware of what skills are required to work in new economy companies located in Campinas. Many interviewees report lack of people with the specific skills required by local businesses.

#### *Customize Managerial Knowledge According to SMEs Needs*

New economy SMEs do complain about the “general” managerial knowledge provided by SEBRAE. The importance of these companies should be considered when proposing courses on managerial techniques.

#### *Provide a Better Infrastructure to New Economy SMEs*

Despite the excellent infrastructure of Campinas, some new economy SMEs are operating their businesses in places with poor conditions, since they do not have enough money to pay for a “privileged” area. The public sector, especially local administration, should provide these companies not only room in incubators but also in new industrial parks.

#### *Curtail the Competition for Companies Among Municipalities*

The lack of a governance structure for the new economy cluster may be one of reasons for intense competition for new companies among cities comprising the Metropolitan Region of Campinas. Local authorities of these cities should change their focus from short term achievements to a common project for the region.

### *Tax Relief*

All three governmental levels should reduce the tax burden for new economy companies, especially SMEs. The local administration must turn its “temporary” tax incentives into definitive ones, in order to attract not only new enterprises but to also foster the development of those already in the city.

### *Make Process of Research Agencies Simpler, Objective and Faster*

Interviewees complain about the great amount of paperwork to apply for funding, as well as the slowness in evaluating these applications and the unclear assessment criteria. Federal and state agencies should not only make these applications simpler for companies and speed up the assessment process, but they also should open their boundaries for the potential non-academic public.

### *Bring Public Sector Closer to SMEs*

The public sector, at least Campinas’ local administration, recognizes that new economy SMEs are not given appropriate treatment. These companies desire regular interaction with local, state and federal entities. A new governance structure and more communication channels may help this happen, but they do not guarantee that interaction happens among public and private agents. Public sector officials should leave their offices and visit the business environment of local new economy SMEs. important – establish a trustworthy relationship with them.

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The continuous diversification of the Brazilian economy, moving from agriculture and natural resources to higher valued-added sectors such as information technology has taken place largely in the South of the country. The municipality of Campinas in the State of São Paulo provides a perfect example. The IT cluster

there (also including biotechnology, avionics, pharmaceuticals, advanced manufacturing). While the ITs cluster has achieved great progress during the last decade, shortcomings in the formulation, design, and implementation of state and municipal public policies, in consort with SMEs and their associations, are clearly limiting the potential of this cluster and the firms that reside within it. This exploratory study and its findings suggest a path forward for policymakers and the private sector to foster the growth and sustainability of the information technology sector in a leading economic subregion of Brazil.

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