Cooperative Research and Development Project between FUB/CDT and TERRACAP

Technical and Economic Feasibility Study for Digital Capital Technology Park [Parque Tecnológico Capital Digital – PTCD]

Product 5.8 – Prospection for Alliances and Partnerships	
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1 INTRODUCTION

Companhia Imobiliária de Brasília (Terracap), established through Law No. 5861, of December 12th, 1972, is a state-owned enterprise under the Government of the Federal District (GDF). It is governed by the law under which it was established, its articles of incorporation and the applicable law of corporations, and Terracap's purpose is to operate in the real estate business for the best interest of the Federal District in exchange of compensation, and this business comprises use, acquisition, management, provision, development, encumbrance or disposal of properties.

Pursuant to Law No. 4586, of July 13th, 2011, Terracap also took on the role of Development Agency for the Federal District by designing, deploying and implementing economic and social development programs and projects for the Federal District, and it may also foster public-private partnerships, incorporation of special purpose companies (SPEs) and engage in urban joint ventures for the deployment and development of projects considered to be strategic by the Government of the Federal District. In view of this backdrop, Terracap plays a key role in the public policies included in programs that are being implemented by the Federal District Government, in particular with regard to the Parque Tecnológico Capital Digital [Digital Capital Technology Park] – PTCD.

Considering the existing collaboration between the University of Brasilia Foundation (FUB) and the Ministry of Planning, Budget and Management's Federal Property Department – SPU established in January 2009, with coordination of the Decision Making Technology Laboratory – LATITUDE, University of Brasilia's Department of Electrical Engineering, through three projects for the development of SPU's processes, methodologies and management tools, Terracap realized that the approach to dealing with Federal property can be extended and applied to Federal District's properties, in particular to the management of the PTCD project.

Furthermore, issues related to the PTCD implementation strategy have been addressed in previous studies conducted by UnB upon request by the GDF (FAP-DF-FUB Project, 2008), thus enabling management of PTCD to be addressed on an informed basis. This experience underpins the participation of the LATITUDE Laboratory team this in this new environment. Also, the PTCD is an information and communications technology park and its feasibility study will need to provide answers to questions such as: type and

size of companies in the ICT sector that can operate at the park; types of services and products with the greatest potential; labor capabilities, existing and required professional skills (electrical, network, computing, production, and automation and control engineers, computing and information scientists, technologists); academic institutions in a position to research, innovate and transfer technologies to the park, etc.

In view of the above, and considering CDT/UnB's extensive experience in the preparation of technical and economic feasibility studies (TEFS), Terracap and the LATITUDE Laboratory, with support from CDT/UnB, started discussing the possibility of conducting a cooperative research and development project in order to carry out a TEFS for the PTCD with a view to improving the Federal District's property management and fostering strategic ventures for the Federal District.

As a result, an agreement has been established between Terracap and FUB for the development a technology and information services project to support implementation of the Digital Capital Technology Park – PTCD, with preparation of the products that will make up the respective Technical and Economic Feasibility Study. Project deliverables includes "Product 5.8 – Prospection of Alliances and Partnerships," which is covered in this technical report.

The purpose of this product is to present a survey of organizations with the potential to establish strategic, tactic and operating collaborations with the PTCD. Criteria for the evaluation of potential collaborations are then proposed, including abilities to foster technological development, product innovation, cost reduction, penetration into markets, competitiveness, scale, funding, and logistical support. Lastly, potential formal processes to establish an alliance/partnership conflict control and risk sharing procedures are proposed.

2 ORGANIZATIONS FOR ALLIANCES AND PARTNERSHIPS

2.1 Collaborations and Alliances

Technological development is increasingly complexity and involves access to key information, especially in industries where innovation has become the primary competitive weapon. In this environment, the structure of industries becomes influenced by a “complex web of alliances” (Castells, 2003, p. 220)[1] between businesses.

Hence, understanding the tools to coordinate such collaborative relations for technological development reveals a growing concern about the issues faced by organizations in their interaction with the environment and to ensure their technological development activities are effective. According to Hall (2004)[2], strategic alliances, including relations that revolve around technological development activities, comprise specific resource flows, called joint programs, which cover not only interdependencies, but also collaborative actions that may grow extremely strong and extend to more than one specific domain.

Alliances can also be understood by means of a set of cyclic or sequential steps or processes, including relationship building and maintenance and expansion of transactions between parties until it eventually comes an end. Understanding alliances from this dynamic perspective shows its relevance one considers that not only structural, but also procedural aspects, determine the conditions of the relationship between the partner companies in a strategic alliance.

Therefore, this study sets out to analyze control mechanisms in cases of strategic alliances that focus on technological development activities, from the perspective of inter-organizational relationships, including the stages of a cyclical nature, involving negotiation, commitment and execution activity. Therefore, the study focuses on the procedural dynamics of relations associated to technological development activities so that future studies may allow understanding its relationship to potential outcomes of technological activities and innovation.

2.2 Strategic Alliances

In the broader context of organizational studies, alliances are classed as specific inter-organizational relationships. According to Hall (2004)[2], joint programs, joint ventures and strategic alliances can be described as a special type of flow of resources, where there are not only relationships of interdependent resources, but also collaboration actions, which may extend considerably and over more than one specific area. These relationships can be seen, for example, in collaborative research and development schemes, which may be intentional interactions, and not just a response to environmental pressure.

According to Child (1999)[3], alliances emerge in the form of joint ventures, freely established arrangements such as consortia and collaborations, or even in the form of full integration through mergers. And, according to Hagedoorn (1990)[4], there are forms with no equity interest, on the basis of contractual agreements between partners. This category includes, among others, agreements for joint product development, joint research pacts, mutual licensing agreements and Research and Development (R&D) agreements. According to Klotzle (2002)[5], in the context of research and development, companies are increasingly resorting to partnership agreements to undertake this type of activity, which has traditionally received significant attention from companies. These companies are not only investing in research and development through partnerships, but are also making these investments together with companies from other countries, and often in foreign environments.

2.3 Technology Development Business and Technology Alliances

According to Rodrigues and Carvalho (1991)[6], technology is an intangible asset. In this case, it is a transfer that takes place when a sale is performed is a transfer of knowledge, which may be recorded in written documents or in people's minds. In the opinion of Baêta and Silva (2002)[7], technology has a wide range of purposes: methods to transform inputs into outputs; applying the results of scientific research to the production of goods and services; a specific type of knowledge, process or technique required for practical purposes; knowledge that a society possesses on industrial arts and sciences, including the social and physical phenomena, and their application to the production of

goods and services. Technology management involves strategies for the use of management techniques in order to maximize a company's technological potential, whether by providing internal environments for research and development activities or through external acquisitions.

Technology collaboration between organizations can also be used for the purpose of acquisition and/or development in order to establish partnerships with other companies and education and research institutions for the development of products and processes, where technology cannot be actually transferred by selling right of use or a mere transfer of information. Collaboration can also rely on the action of a Gatekeeper, where a person is responsible for maintaining the contact network and operates inside and outside the company, identifies technology offerings in the market and taps into them for the benefit of the company. This work can establish a robust interaction between a company and academia, for example.

To Hagedoorn (1993)[8], a technology partnership is a type of inter-company collaboration, in which at least one part of the agreement establishes cooperative innovation activities or technological exchanges between the parties. The strategic nature means that at least one of the parties has the expectation of benefiting from the result of joint activities in a particular market position in the long term. In the view of Chesnais (1996, p. 169)[9], alliances make it possible to share the high costs involved in R&D and to exchange technological knowledge.

2.4 Organizations with the Potential to Establish Collaborations

2.4.1 Partnerships with the Federal District Government

In various technology parks in Brazil and abroad, support by the local government is paramount to ensure the venture is successful. Hence, for the PTCD to thrive, support from several local government departments, foundations and bodies is required.

2.4.1.1 FAP-DF – Federal District's Research Support Foundation

The Federal District's Research Support Foundation (FAP-DF) was established to provide investment in research in the Federal District. Additionally, FAP-DF's funding is used to train researchers.

Throughout Brazil, research support foundations assist local technology parks through both specific and general bidding processes.

Some specific bidding processes that may be launched annually to support the PTCD include:

- Bidding process to support use of the PTCD by researchers in the Federal District. Under this contract, FAP-DF leases the facilities built by the EG and provides it to researchers in Federal District who are successful in the qualifying process. Considering that researchers will interact with the companies operating at the PTCD, their close proximity is expected to be the first step towards collaboration. In addition to the leased facilities, it is important that suitable capabilities and scholarships for students are also provided;
- Bidding process to support companies operating at the PTCD. Companies at the PTCD – especially small and medium businesses – may also request support from the FAP-DF through a specific bidding process for the construction of laboratories. Bids must always include a researcher from the Federal District. Under this bidding process, several small and medium technology enterprises in the Federal District would operate at the PTCD with support from FAP-DF.

2.4.1.2 SECTI-DF – Science, Technology and Innovation Department

SECTI's mission is to support scientific and technological development in the Federal District. In the case of the PTCD in particular, SECTI is supposed to act as an interface between the PTCD and technology companies. In addition, SECTI is expected to ensure that 2% of the Federal District's budget is allocated to C&T.

2.4.1.3 SEFAZ-DF – Federal District's Finance Department

SEFAZ is supposed to ensure reduction or exemption of corporate taxes for those companies operating at the PTCD, and may also include the businesses at the PTCD in its

information technology master plan.

For example, taxes on products should be reduced, while taxes such as the property tax (IPTU) should be removed altogether.

2.4.1.4 SDE-DF – Economic Development Department

SDE is supposed to provide funding for construction works to support activities in the PTCD.

This includes investments in urban transport: an underpass, a subway station at the PTCD, bus lines serving the PTCD, a taxi rank, a helipad and bicycle paths.

2.4.1.5 NOVACAP – Urbanization Company for the New Capital of Brazil

NOVACAP is a semi-public corporation whose shareholders include the Federal District Government with 56.12% of shares and the Federal Government, with 43.88% of shares. NOVACAP is responsible for urbanization and civil engineering works.

To support the PTCD, NOVACAP is in charge of the urban design project around the PTCD and in some of its facilities.

2.4.1.6 CEB – Brasilia Energy Enterprise

CEB is a potential partner for the PTCD, not only with regard to infrastructure and utilities, but also in terms of promoting sustainability in activities such as energy production and participation in the energy grid in the future.

On the other hand, in view of its contribution and access to the CT-ENERG fund, CEB could be a partner in financing development and innovation activities.

2.4.1.7 CAESB – Federal District's Environmental Sanitation Enterprise

CAESB is a potential partner for the PTCD, not only in terms of infrastructure and utilities, but also promoting sustainability in activities such as water treatment and reuse.

2.4.1.8 BRB – Bank of Brasilia

BRB's mission is to act as a catalyst of sustainable development in the Federal District and its metropolitan area, and could be a key partner in financing ventures at the PTCD. In any case, BRB already acts as the facilitator of development programs and actions started by FAP-DF.

2.4.2 Partnerships with the Federal Government

Due to the changing nature of the technology market in the digital era, where the flow of new products and services is a constant, investment in the development of a critical mass that ensures ongoing improvement and proper use of knowledge is critical.

In complex environments, such as that where the PTCD's Managing Company will operate, business survival strategies necessarily involve policies that encourage not only competition, but also collaboration. Survival in a globalized world relies on the establishment and maintenance of collaboration networks, such as strategic alliances.

At the national level, specifically within federal government bodies and institutions, the following possibilities are key.

2.4.2.1 UnB – University of Brasilia

UnB[1] was designed to reconcile the rigor of science and the boldness of art. Knowledge production at UnB follows a three-dimensional model of education, research and extension, which is conducive of a high-quality higher education that is mindful of all forms of knowledge and committed to social empowerment.

Inaugurated on April 21, 1962, UnB currently has 2,308 professors, 2,692 administrative staff, 30,727 undergraduate students and 8,913 graduate students. It consists of 26 institutes and colleges and 18 specialized research centers. It offers 105 undergraduate programs, 30 of which during the night period and 10 distance learning

[1] Available at http://www.unb.br/ (accessed on 03/06/212).

programs. There are also 147 *stricto sensu* post-graduate programs and 22 *lato sensu* specializations. The programs are delivered in four campuses across the Federal District: Darcy Ribeiro (Plano Piloto), Planaltina, Ceilândia, and Gama. The supporting units include the University Hospital, the Central Library, the Veterinary Hospital, and the Água Limpa Farm.

The various potential collaborations and alliances between UnB and the PTCD include the following:

- Science and technology council;
- Mechanisms for technology transfer;
- Incubation of companies for the PTCD;
- Innovation mechanisms;
- Mechanisms for promoting corporate research;
- Introduction to scientific research;
- Basic and applied research;
- Internship programs;
- *Lato sensu* post-graduation programs (vocational courses) and *stricto sensu* programs (masters, professional masters, and PhDs);
- Continuing education programs (languages, technologies, etc.);
- Partnerships with distinguished international research and educational centers, such as the Massachusetts Institute of Technology – MIT, the California Institute of Technology – Caltech, Stanford University, etc.

2.4.2.2 MDIC – Ministry of Development, Industry and Foreign Trade

MDIC[2] was established through Provisional Measure No. 1911-8, of 07/29/1999 (published in the Official Gazette on 07/30/1999), and its mandate covers the following areas:

- Industry, trade and service development policy;
- Intellectual property and technology transfer;

[2] Available at http://www.mdic.gov.br/sitio/ (accessed on 03/06/2012).

- Industrial metrology, standardization and quality;
- Foreign trade policies;
- Regulation and implementation of foreign trade-related programs and activities;
- Enforcement of trade defense mechanisms, participation in international negotiations on foreign trade;
- Development of policies to support micro and small business and crafts workers;
- Implementation of trade registration activities.

Entities under the MDIC include the following:

- Superintendency of the Manaus Free Trade Zone (SUFRAMA);
- National Industrial Property Institute (INPI);
- National Institute of Metrology, Standardization and Industrial Quality (INMETRO);
- Brazilian Development Bank (BNDES);
- Brazilian Agency for the Promotion of Exports and Investments (ApexBrasil).

The various fronts where the MDIC operates as part of its mandate, together with the economic and social development policies pursued the entities under it, are key for the PTCD to achieve its goals, such as offering preferential terms for the establishment and operation of businesses.

2.4.2.3 MEC – Ministry of Education

MEC[3] was founded in 1930 and initially acted in domains pertaining to various ministries, such as health, sports, education, and the environment. It was not until 1992 that a federal law transformed MEC into the Ministry of Education and Sports, and finally in 1995 the institution becomes responsible for education only. Over the past 80 years, MEC has sought to promote quality in education throughout the Country.

Against this backdrop, the various educational development policies pursued by MEC represent attractive opportunities for training and development of technical and

[3] Available at http://www.mec.gov.br/ (accessed on 03/06/2012).

university-level staff working at the PTCD. Such initiatives could be pursued through development funds and funding agencies operating under such fund, such as the Fundo Nacional de Desenvolvimento da Educação (FNDE) [National Fund for Education Development], and the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) [Coordination for Enhancement of Higher Education Personnel].

The FNDE is specifically a federal agency whose mission is to provide financial and technical assistance, and to work towards universalization of high quality education. Its vision is to become a benchmark for the implementation of public policies, and the FNDE is committed to innovation and entrepreneurship. In addition, CAPES plays a key role in the expansion and strengthening of international scientific collaboration schemes, access to and dissemination of scientific work, and investment in the training of university-level workers in Brazil and abroad.

All lines of action described above are vital for the growth and sustainability of the PTCD, and they are in line with its goals.

2.4.2.4 MCTI – Ministry of Science, Technology and Innovation

The MCTI[4] was established through Decree No. 91146, of March 15, 1985, and its mandate was established through Decree No. 5886, of September 6, 2006. As an organization in the direct public administration, the MCTI's mandate covers the following domains: national policy on science, technology and innovation research; planning, coordinating, supervising and controlling science and technology activities; policy on the development of computing and automation; national policy on biosecurity/space policy; nuclear policy and on the export of sensitive goods and services.

With the incorporation of the two most important funding agencies in the country – the Financiadora de Estudos e Projetos (FINEP) [Studies and Projects Finance Organization] and the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) [National Council for Scientific and Technological Development] and their research units – the MCTI started coordinating implementation of programs and activities in support of the National Policy on Science, Technology and Innovation. The purpose of this policy is to transform

[4] Available at http://www.mcti.gov.br/ (accessed on 03/06/2012).

the sector into a strategic component of Brazil's economic and social development, thereby helping distribute its benefits fairly throughout society.

In addition to the funding agencies, the MCTI system includes the Centro de Gestão e Estudos Estratégicos (CGEE) [Center for Management and Strategic Studies], the Agência Espacial Brasileira (CNEN) [National Nuclear Energy Commission], the Agência Espacial Brasileira (AEB) [Brazilian Space Agency], 19 science, technology and innovation research units; and four state-owned companies: Indústrias Nucleares Brasileiras (INB); Nuclebrás Equipamentos Pesados (Nuclep); Alcântara Cyclone Space (ACS), and Centro de Excelência em Tecnologia Eletrônica Avançada (Ceitec).

With the support of this group of institutions, the MCTI performs its strategic duties by conducting research and studies that translate into new knowledge and technologies, as well the creation of national products, processes, management and patents. Such activities are in line with the goals and offerings of the PTCD, and make up a set of favorable opportunities to be tapped into to foster the Park's technology growth and development on an ongoing basis.

2.4.2.5 ApexBrasil – Brazilian Agency for the Promotion of Exports and Investments

ApexBrasil's[5] work involves promoting trade in Brazilian products and services abroad and attracting Foreign Direct Investment (FDI) to strategic sectors of the Brazilian economy, and this is reflected in its website.

Operating under the MDIC, ApexBrasil's mission is to develop the competitiveness of Brazilian companies by advancing internationalization of their businesses and attraction of foreign direct investment. Both activities are important for the PTCD to achieve its goals, which is even more explicit in the description of ApexBrasil's activities:

- Support to exports: Integrated actions that cover the entire process of opening up key markets for Brazilian companies, from qualification for the export market to diversified trade promotion platforms and solutions in the following areas:
    - Information: Studies on business and competitive intelligence that inform the decision-making of Brazilian companies and their strategies on

[5] Available at http://www.apexbrasil.com.br (accessed on 03/06/2012).

entering the international market, with tips on potential markets, sectors, global trends, and business opportunities;

- Qualification for the export market: The Industrial Exporting Extension Project (PEIEX) qualifies Brazilian companies with an export potential by providing technical/managerial and technological solutions, and is designed to promote the exporting culture and encourage competitiveness by qualifying and expanding the market potential of those companies that are new to foreign trade;
- Trade promotion: Various integrated actions in partnership with the private sector: prospective and commercial missions; business rounds with potential foreign buyers; Brazilian pavilions in major international fairs; business promotion in retail chains and visits of importers and trend-setting professionals to Brazil's private sector facilities;
- Positioning and branding: Disseminating knowledge and strengthening the brand and positioning of Brazilians products and services and of Brazil as an important trading partner and as an attractive market for investments through actions and projects to build reputation and brand, such as integrated and synergic actions in segments in a sector with a view to better positioning the Country's brand at international level;
- Support to internationalization: Actions to support expansion of Brazilian companies into international markets on a proactive and competitive basis, and to increase the share of their products and services in the international market as strategic factors for competitiveness by encouraging attributes such as innovation, sustainability and design;
- Attraction of Foreign Direct Investment (FDI): ApexBrasil works towards attracting FDI to Brazil with a focus on strategic sectors for the Brazilian economy and on fostering Brazil's competitiveness and development. The goal is to attract private-sector investments that support transfer of innovative technologies to Brazilian companies and contribute to the consolidation of supply chains and exports and to proactively open up international markets for Brazil.

2.4.2.6 SUDECO – Superintendency for the Development of the Mid-West Region

SUDECO[6] was discontinued in 1990 and then brought back to life in 2011 with the aim of preparing the Development Plan for the Mid-West, which was designed to reduce regional inequalities, enhance competitiveness of the regional economy and foster social inclusion. This plan should be integrated with the national, state and local development policies and plans, and in particular with the National Policy for Regional Development. The new SUDECO will make it possible to regulate the Development Fund for the Mid-West Region (FDCO), which will secure funding for the implementation of large-scale development and infrastructure projects, and through the Constitutional Fund for the Mid-West Region (FCO) it will fund investments with the regional private sector, which are considered a priority under the Regional Plan for the Development of the Mid-West Region.

In order to boost the local economy, reduce regional and social inequalities, promote sustainable and balanced development at regional level, SUDECO's approach will be to develop modern technologies that benefit local small and large businesses and the rural and urban workforce entering the labor market. It will also manage the Integrated Development Program for the Federal District and Metropolitan Area (RIDE).

The PTCD may benefit from the following features of the new SUDECO:

- Leveraging development of the Mid-West Region so as to put it in equal footing with the other regions;
- Developing public policies to implement new business strategies with a view to expanding the domestic market by bringing in private investment and expanding export opportunities for new products;
- Boosting the economy with new financing instruments to ensure funds for expansion of investments, including segments of grassroots economy, by supporting job and income creation;
- Innovating and upgrading private sector strategies by introducing and disseminating information management techniques, expanding and managing knowledge and competitive intelligence;

[6] Available at http://www.sudeco.gov.br (accessed on 03/10/2012).

- Supporting public and private investments in the areas of economic and social infrastructure, training human resources, technology innovation and diffusion, social and cultural policies, and development initiatives;
- Setting economic and social goals and targets for sustainable development in the Mid-West Region by fostering competitiveness of the regional private sector at national and international level;
- Planning and coordinating regional action based on sub-regional and local benchmarks with a view to building on and tapping into the extraordinary potential of the Mid-West Region.

2.4.2.7 Receita Federal (Brazilian Tax Administration)

The Brazilian Tax Administration[7] has a key role to play with the establishment of a customs clearance unit (UDA) at the PTCD. The UDA will perform the following activities at the PTCD:

- Customs administration, supervision and control services, including turning premises into customs warehouses;
- Management of the Integrated Foreign Trade System (SISCOMEX), subject to the jurisdiction of other authorities.

2.4.3 Public, State-Owned and Strategic Enterprises

With regard to federal state-owned enterprises and other strategic enterprises for the development of Brazil, the following options are key.

2.4.3.1 BNDES – Brazilian Development Bank

BNDES[8] is a federal enterprise, and it is currently the main mechanism for long-term

[7] Available at http://www.receita.fazenda.gov.br (accessed on 03/10/2012).

[8] Available at http://www.bndes.gov.br/ (accessed on 03/10/2012).

financing of investments across the economy, based on a policy that takes into consideration social, regional and environmental dimensions.

It is important that BNDES provide funding to the EG to support construction of the PTCD.

2.4.3.2 PETROBRAS – Petróleo Brasileiro S.A.

A Petrobras[9] – Petróleo Brasileiro S.A. is a publicly traded company (corporation) whose majority shareholder is the Government of Brazil (the Brazilian State).

Establishment of a Petrobras office at the PTCD, as well as research laboratories on extraction, storage and transportation are modes of collaboration with PETROBRAS for the benefit of the PTCD.

In particular, it should be pointed out that this collaboration could be in conjunction with the UnB since PETROBRAS supports graduate programs and research related to production engineering at the UnB.

2.4.3.3 EMBRAPA – Brazilian Agricultural Research Corporation

EMBRAPA[10] is a public research institution under the Ministério da Agricultura, Pecuária e Abastecimento [Ministry of Agriculture, Livestock and Food Supply].

Setting up laboratories by EMBRAPA at the PTCD would also be key to raise the profile of agronomic research in the Federal District.

2.4.3.4 EMBRAER – Brazilian Aeronautics Company S.A.

Embraer[11], Empresa Brasileira de Aeronáutica S.A. (BM&F Bovespa/NYSE Euronext), is a Brazilian conglomerate for the manufacturing of commercial, business, agricultural, and military aircraft.

[9] Available at http://www.petrobras.com.br/ (accessed on 03/10/2012).

[10] Available at http://www.embrapa.br/ (accessed on 03/10/2012).

[11] Available at http://www.embraer.com/ (accessed on 03/10/2012).

Just like Petrobras, it is important to establish an office and laboratories by EMBRAER at the PTCD.

2.4.3.5 BB – Bank of Brazil S.A.

Since BB[12] will have a datacenter at the Park, it is already a strategic partner for the PTCD, and is a potential client and catalyst of ventures in the technology services sector.

2.4.3.6 CEF – Federal Savings Bank

Just like BB, as CEF[13] will share the datacenter at the Park, it is already a strategic partner for the PTCD, and is a potential client and catalyst of ventures in the technology services sector.

2.4.3.7 SERPRO – Federal Data Processing Service

Serpro[14] is a government enterprise under the Ministry of Finance. It was created on December 1, 1964, through Law No. 4516, with the purpose of modernizing and streamlining strategic sectors of the Brazilian government. Serpro operates in the business of providing Information and Communication Technology services to the public sector, and is considered to be one of the largest government IT organizations in the world.

Serpro's headquarters is located in the Federal District, and due to its position as a benchmark by enhancing and developing technologies used by public sector agencies in Brazil – possibly the largest consumer of IT products and services in the Country – is indeed an important partner to be sought for the PTCD.

2.4.4 Private Alliances and Partnerships

[12] Available at http://www.bb.com.br/ (accessed on 03/10/2012).

[13] Available at http://www.caixa.gov.br/ (accessed on 03/10/2012).

[14] Available at http://www.serpro.gov.br/ (accessed on 03/10/2012).

Partnerships and alliances are different modes of collaboration that the PTCD's managing company must establish and maintain at regional, national and international levels in order to properly manage and meet the existing requirements.

Among the potential partners in the private sector, well established and distinguished organizations at both levels are key, as described below.

2.4.4.1 National Partnerships

2.4.4.1.1 SEBRAE – Brazilian Micro and Small Business Support Service

Established in 1972 as a private nonprofit organization, Sebrae[15] advances training programs and fosters the formation of associations, territorial development and market access through partnerships with public and private sector. It is an advocate of tax reduction and removal of red tape to facilitate opening up markets and expanding access to credit, technology and innovation by micro and small enterprises.

Sebrae now has a network of nearly 700 face-to-face service stations throughout Brazil. There are more than 4,900 full-time employees and approximately 8,000 consultants and accredited instructors working to impart knowledge to business owners and would-be business owners. Sebrae has a focus on professional excellence to serve micro and small enterprises in various industries across the supply chain.

A part of these efforts gained visibility when the Micro and Small Enterprise Act [Lei Geral da Micro e Pequena Empresa] (Complementary Law 123/06) was enacted. The law established an enabling environment for small businesses. This Act has made significant progress, especially in terms of the simplified taxing system (Supersimples) and incentives to the formation of sole proprietorships (Complementary Law 128/08). The Government Procurement mechanism also benefitted this sector as it represents a fundamental niche business to boost revenue and competitiveness for small businesses.

These actions underline the role played by Sebrae as a catalyst of entrepreneurship and show its expertise as a potential partner for the implementation, maintenance and development of the PTCD. Companies at the PTCD – especially small and medium

[15] Available at http://www.sebrae.com.br (accessed on 03/10/2012).

businesses – may request support from Sebrae through specific bidding processes to support their growth and development.

2.4.4.1.2 Anprotec – National Association of Entities Promoting Innovative Ventures

Anprotec[16] is the association that represents business incubators, technology parks and innovative ventures in Brazil. Anprotect promotes training activities, coordination of public policies and generation and dissemination of knowledge.

It has been around for twenty-five years now, and currently brings together 261 organizations representing approximately 400 business incubators and 6,300 innovative ventures, which together account for about 33,000 jobs in Brazil.

Anprotec's mission is to bring together, represent and advocate for the interests of Entities Promoting Innovative Ventures, notably managers of Incubators, Parks, Hubs and Techno-Hubs by strengthening these business models as tools for the sustainable development of Brazil in order to create and strengthen knowledge-based companies.

Its goal is to be increasingly recognized and appreciated – in Brazil and abroad – as a leader in creating, developing and building on innovative projects geared towards economic, social and cultural transformation of regions and nations.

Anprotec operates in the business of innovative entrepreneurship by supporting organizations driving innovation and by qualifying entrepreneurs and managers in the national movement of Technology Parks and Business Incubators.

Below are some members of Anprotec:

- Guarulhos Development Agency – AGENDE – SP;
- Sorocaba Development and Innovation Agency – INOVA SOROCABA – SP;
- USP Innovation Agency – SP;
- São José dos Campos Technology Park Association – SP;
- Campinas Software Excellence Association – SOFTEX – SP;
- Regional Innovation and Technology Transfer Center - CRIT – MG;
- Itajubá Science and Technology Park – MG;

[16] Available at http://www.anprotec.org.br/ accessed on 03/25/2012

- Belo Horizonte Technology Park BH-TEC – MG;
- Viçosa Technology Park - PTV – MG;
- Norte Fluminense High Technology Park - TECNORTE/FENORTE – RJ;
- Santa Cruz Technology Park – RJ;
- Rio de Janeiro Technology Park – RJ;
- Rio de Janeiro Biotechnology Hub - BIORIO Foundation – RJ;
- Western Agroindustrial Technology Park - PTAO – PR;
- FRANCISCO SCIARRA Technology Park in Londrina – PR;
- Maringá Technology Park - TECNOPARQ – PR;
- PUCPR Technopark – PR;
- Unesc Science and Technology Park – I.PARQUE – SC;
- Joinville Technological Innovation Park – PITJ – SC;
- Alfa Technology Park – SC;
- Sapiens Parque S.A – SC;
- UFRGS's Science and Technology Park – RS;
- UPF's Science and Technology Park – RS;
- CIENTEC's Technology Park – RS;
- São Leopoldo's IT Hub Technology Park – RS;
- Vale dos Sinos' Technology Park – RS;
- Ulbra Corporate Technology Park – PTU – RS;
- Sergipe Technology Park – SERGIPETEC – SE;
- Science, Technology and Art Projects Center – NECTAR – PE;
- Center for the Promotion of Innovative Business - Fomento e Pólo Tecnológico Olinda Digital – PE;
- Porto Digital Management Center – PE;
- Paraíba Technology Park Foundation – PAQCTPB – PB;
- Paraíba Network of Hubs, Parks and Business Incubators – REPARI – PB;
- Technology Development Park – PADETEC – CE;
- NUTEC Technology Park – PARTEC – CE;
- Guamá Science and Technology Park – PA;

2.4.4.1.3 ABDI – Brazilian Agency for Industrial Development

The Brazilian Agency for Industrial Development (ABDI)[17] was created by the federal government in 2004, with the mission of supporting the industrial policy, in line with the policies of science, technology, innovation, and foreign trade (Law No. 11080).

Operating under the Ministry of Development, Industry and Foreign Trade (MDIC), the ABDI provides an interface between the public and private sectors and contributes to the Country's sustainable development by fostering enhancement of the industrial sector's competitiveness.

By consistently providing technical support to coordination and management levels of the new industrial policy (*Brasil Maior* Plan) and by offering term situation, strategic and technology-related studies for various industrial segments, ABDI helps build sector-specific agendas and advance the institutional, regulatory and innovation environments in Brazil.

The Agency also has the flexibility, agility and scope to promote, monitor and review the *Brasil Maior* Plan, and mobilizes public and private organizations around strategic and operational programs, projects and activities.

- ICT Projects

  Since its inception in 2004, ABDI has been operating in the Information and Communication Technology (ICT) sector, developing projects in the areas of software and services, semiconductors and displays, telecommunications development, digital inclusion and implementation of the digital TV standard.

  Several actions were conducted and partnerships set up in recent years, thus creating an enabling environment for the establishment of the semiconductor device industry, with investments in this sector. One such action was the Brazilian guide for the semiconductor industry – the so-called Blue Book –, which presents the microelectronics industry's landscape in Brazil, with a focus on semiconductors.

  Another major action – the culmination of a project developed by ABDI – is the deployment of 18 integrated circuit design centers (Design Houses) and a

[17] Available at http://www.abdi.com.br/ accessed on 03/26/2012.

state-owned company, Ceitec Semiconductors, which is capable of designing and manufacturing integrated circuits for the Brazilian market. The ABDI secured support from the Studies and Projects Finance Organization (FINEP) and the Brazilian Development Bank (BNDES) to more than 50 projects developed by Design Houses and businesses in the CI-Brazil program.

Training and qualification programs were also put in place for more than 300 experts in integrated circuit design and a legal framework to attract investments across the entire supply chain and the manufacturing of integrated circuits and displays. Moreover, ABDI played a decisive role in discussions that culminated in the enactment of Decree No. 6945/09, which decreased from 20% to 10% the social security tax rate applicable to the payroll of IT companies that export their products.

In 2010, ABDI released a series of focus publications on ICT applications, which feature the present status and future scenario of new technologies in order to support the development of public policies for the sector, and to assist in meeting the goals set forth in the Production Development Policy (PDP).

- Innovation Portal

  The Innovation Portal (www.portalinovacao.mct.gov.br) is a leading tool by ABDI to provide guidance to companies wishing to invest in research and development. It relies on a system that crosses information on technology supply and demand entered by users and other sources in technical and scientific industries and communities.

  Inspired by a need identified by the Ministry of Science, Technology and Innovation (MCTI) and the Center for Management and Strategic Studies (CGEE), the portal is managed by the ABDI. The Agency helps continuously enhance tools to foster innovation management by publicizing the portal's functionalities with the stakeholders in the National Innovation System and the Brazilian business community.

  In addition to a proprietary database of companies, the Innovation Portal has the CNPq – National Council for Scientific and Technological Development's Lattes Platform as a source of information. This is the largest skills base in Brazil, which includes over 1.5 million CVs of experts, Research and

Development (R&D) teams and Science, Technology and Innovation Institutions. It also has patent registrations and applications submitted to the National Industrial Property Institute (INPI) over the past 20 years.

The Portal provides skills maps, social networks, strategic information and innovation indicators with approaches from the various actors in the National Innovation System. The tool also provides extensive content on funding opportunities; the legal framework for innovation; technical and scientific journals; selected news; a calendar of major national and international events in science and technology; and a channel for the creation of professional communities.

2.4.4.1.4 ANPEI – National Association for Research, Development and Engineering of Innovative Companies

ANPEI[18] was created in the early 1980s, under the PACTo – Science and Technology Administration Program, by the University of São Paulo's Administration Institute Foundation.

The RENAD's – National Meetings of Leaders of Technology Centers from Industrial Enterprises are a regular activity in this program, which have became increasingly attended by experts and managers responsible for corporate technology development efforts, who saw in them an opportunity to address issues of common interest. The following topics were covered: improving conditions for corporate R, D & E; raising the profile of this function to top management; exchange of successful management models; recruitment and training of human resources, etc.

In early 1983, creation of an association at the national level was proposed and approved within RENAD's, not only to keep up with the spirit of these meetings – mainly for exchanging information –, but to play an active role to advocate for companies engaged in R, D & E with the government and the community.

About a year later, in April 1984, under the leadership of an Implementation Committee, ANPEI was officially established as a nonprofit organization, and it is currently

[18] Available at http://www.anpei.org.br/ accessed on 03/26/2012.

called National Association for R, D & E of Innovative Companies. The minutes for its establishment were signed by 28 representatives from industrial companies, described as “Sócios Titulares Fundadores” (Founders Full Partners) in the Articles of Incorporation.

As a representative entity of the segment of innovative companies and institutions in several industries, ANPEI works with government bodies and decision-makers in order to elevate the status of technological innovation to a strategic factor in the economic and science and technology policy in Brazil.

ANPEI’s actions are geared towards:

- Strengthening inclusion of technological innovation in the political agenda of the Country, with a view to developing and implementing public policies aimed at encouraging innovation;
- Promoting technological innovation as a strategic factor to boost corporate competitiveness;
- Raising awareness of society about the importance of technological innovation as a driver of national economic development;
- Provide training on technology to companies so that they can better manage their innovation efforts;
- Supporting academia in training human resources generating scientific knowledge.
- National innovation awareness and mobilization program – Pró-Inova

  This focuses on encouraging companies to organize and prepare to grow and compete through innovation. Pró-Inova involves public and private organizations and has the following primary objectives: engaging businesses and society on the importance of innovation; encouraging companies to use tools to support innovative activities; publicizing programs and tools to support innovation.
- Practical Guide to Innovation

  This is intended to provide a permanent and interactive tool to support innovative activities and assist companies in the use of mechanisms to encourage and foster innovation. The **Practical Guide to Innovation** is a source of constant surveying by those involved in the national innovation system. Through a consultation process, the intention is to significantly increase

compliance and enforcement of laws to encourage innovation, as well as to improve the quality of proposals submitted by businesses to development agencies.

2.4.4.1.5 SOFTEX – Association for the Promotion of Brazilian Software Excellence

SOFTEX[19] was established in 1996 and is a Civil Society Organization of Public Interest (OSCIP), headquartered in Campinas, SP, and with an office in Brasilia, DF. It is the manager of the Program for Promotion of Brazilian Software Excellence – the SOFTEX Program –, which is a priority program for the Ministry of Science, Technology and Innovation (MCTI), whose focus is on the development of markets and sustainable expansion in the competitiveness of the Brazilian Software and IT Services Industry (IBSS).

The SOFTEX System, in turn, provides national coverage. It is comprised by SOFTEX, which coordinates an extensive network of regional agents, which operate in association with 2,000 companies in the software and IT services business, which receive support through a series of initiatives in the system.

Since its inception, SOFTEX has been expanding its business and network of partners, thus contributing significantly to Brazil's social and economic development and for opening up the global economy for the Country. To this end, SOFTEX designs, implements and coordinates activities and projects in accordance with the guidelines established by the SOFTEX program. The following projects deserve special notice: the PSI SW (Integrated Sectoral Project for Software and IT Services Exports), the MPS.BR (Brazilian Software Process Improvement); Observatório SOFTEX; PAEMPE Program (Business Alliances Program) and PROSOFT (Program for the Development of the Brazilian Software and Information Technology Services Industry).

The SOFTEX/PROSOFT program is particularly relevant to the PTCD in view of its objective of contributing to the development of the Brazilian Software and IT Services Industry (IBSS) by financing businesses. It relies on the Brazilian Development Bank (BNDES) to provide funding and to manage SOFTEX's Innovation & Funding Board. This

[19] Available at http://www.softex.br/, accessed on 03/26/2012.

program operates in the following fronts:

- Working continuously on trade promotion and business generation for Brazilian software companies in the international market, with a focus on those markets less affected by the economic crisis and seeking to build on the positions achieved as a result of actions in previous years;
- Support the export business by classing companies by vertical, business model, and also considering their degree of readiness to export;
- Adding to business development support by a team of consultants who specialize in specific verticals and are qualified to assist companies in developing international business;
- Supporting regional projects that seek to take advantage of synergies between companies in specific regions of Brazil;
- Using online tools to capture business opportunities in the international market, whether by marketing IT solutions and services provided by Brazilian companies or managing sales opportunities, and also by focusing on distribution channels abroad;
- Raising awareness of the Brazil IT+ brand in the international market so that it is perceived as a source of IT products and services of high quality and reliability.

2.4.4.2 International Partnerships

2.4.4.2.1 IASP – International Association of Science Parks

THE IASP[20] is a worldwide network of Science and Technology Parks. THE IASP acts as an interface between professionals working with technology parks around the world and boost growth for those providing services efficiently to our members.

The IASP is a worldwide network. Its definition of Technological Parks covers the various models in place around the world. A study was carried out to identify key shared features of the various existing models, as well as standards and minimum requirements

[20] Available at http://www.iasp.ws/ accessed on 03/30/2012

that a venture must have to be recognized as a "Science Park".

The IASP reviewed and compared the relative models and experiences with Science/Technology Parks in the 63 country clubs throughout their members' locations to ensure a truly global STI definition.

IASP's members help enhance the competitiveness of enterprises and entrepreneurs in their regional and local areas, and contribute to global economic development through innovation, entrepreneurship and transfer of knowledge and technology.

Its primary objectives include:

- Creating new business opportunities and adding value to mature companies;
- Fostering entrepreneurship and incubation of new innovative enterprises;
- Generation of knowledge based on innovation efforts;
- Building attractive environments to emerging knowledge workers;
- Enhancing the synergy between universities and the private sector.

Affiliation of the Digital Capital Technology Park – PTCD with the IASP will allow the PTCD to build international partnerships with a wealth of existing technology parks around the world, whether by type of focus, location, size, etc. This is a tangible possibility since the IASP has members in various areas of the world. Below is a list of some of its members:

- Argentina
  - Fundación Parque Tecnológico Misiones
  - UNSAM - Universidad Nacional de General San Martín
- South Africa
  - The Innovation Hub
- Germany
  - Technologiepark Heidelberg GmbH
  - Technologiepark Ostfalen
- Australia
  - Brisbane Technology Park
  - Technology Parks Australia and New Zealand
- Austria
  - Tech Gate Vienna Science and Technology Park

  - Lakeside Science & Technology Park
- Belgium
  - CREALYS®- Science Park of the Province of Namur
  - Louvain-la-Neuve Science Park (UCL)
- Canada
  - Laval Technopole
  - Québec Metro High Tech Park
- China
  - Tsinghua University Science Park - TusPark
  - Zhongguancun Science Park (ZSP)
- Colombia
  - Parque Tecnológico de la Umbría - Universidad San Buenaventura de Cali
- South Korea
  - Chungnam Techno-Park
  - Daejeon Technopark
- Croatia
  - Technology Park Varazdin Ltd
- Danemark
  - INCUBA Science Park Ltd.
  - NOVI Science Park
- United Arab Emirates
  - CERT Technology Park
- Slovenia
  - Razvojni center za informacijske in Komunikacijske tehnologije, d.o.o.
  - Technološki Park Ljubljana
- Spain
  - Parque Tecnológico de Andalucía
  - 22@Barcelona

- Estonia
  - TEHNOPOL Tallinn Science Park
  - Tartu Science Park
- Finland
  - Joensuu Science Park
  - Lahti Science and Business Park Ltd.
- France
  - Fondation Sophia Antipolis
  - Technopole Rennes Atalante
- Greece
  - Science and Technology Park of Epirus S.TE.P.E. S.A.
  - Thessaloniki Technology Park
- The Netherlands
  - Zernike Science Park
  - High Tech Campus Eindhoven
- India
  - IKP Knowledge Park
  - MARG Science Park
- UK
  - Manchester Science Parks Ltd
  - Cambridge Science Park
- Ireland
  - Glashrooneen Ltd - SMART Park
- Italy
  - Fondazione Parco Tecnologico Padano
  - Kilometro Rosso Science Park
- Japan
  - Kyoto Research Park Corp.
- Lithuania
  - Klaipeda Science and Technology Park

  - Kaunas High-Tech & IT Park
- Malaysia
  - Malaysian Technology Development Corporation - Technology Incubators
  - Technology Park Malaysia Corporation Sdn. Bhd.
- Mexico
  - Parque de Innovación Tecnológica del Centro de Investigaciones Biológicas del Noroeste, S.C.
  - Tecnotam Science and Technology Park (Fideicomiso Nuevo Santander)
- Norway
  - Forskningsparken AS
  - Lillestrom Science Park, Kjeller
- Oman
  - Knowledge Oasis Muscat (KOM)
- Panama
  - Tecnoparque Internacional de Panama
- Paraguay
  - Fundacion Parque Tecnológico Itaipu
- Poland
  - Jagiellonian Centre of Innovation Ltd (Krakow Life Science Park)
  - Krakow Technology Park
- Portugal
  - Taguspark - Lisboa Science & Technology Park
  - PCI - Parque de Ciência e Inovação, S.A
- Qatar
  - Qatar Science & Technology Park
- Tchec Republic
  - Technology Park Brno a.s.
  - Science and Technology Parks Association CR

- Russia
  - MSU Science Park
  - Technopark - Zelenograd, OSJC
- Cingapore
  - Singapore Science Park Ltd.
- Sweden
  - Aurorum Science Park
  - Eskilstuna Jernmanufaktur AB (Munktell Science Park)
- Switzerland
  - TECHNOPARK®-Alliance
  - SwissParks.ch (Club of Swiss Technology and Business Incubators)
- Taiwan
  - Hsinchu Science Park Administration
  - Southern Taiwan Science Park
- Tunisia
  - Sfax Technopark Management Company
  - Sidi Thabet BioTechPole
- Turkey
  - Ari Teknokent - Istanbul Technical University´s Technopark
  - Gazi Teknopark
- Venezuela
  - Parque Tecnológico Sartenejas - PTS
- Vietnam
  - Hoa Lac Hi-Tech Park Management Board

2.4.4.2.2 AURP – Association of University Research Parks

In 1986, several CEOs of science and technology parks found that the concept that research institutes related to parks was sweeping meeting rooms around the world and then held the first international conference in the United States to discuss the future of

technology parks.

After that meeting in Tempe, Arizona, the Association of University Related Research Parks (AURRP) was established as a response to this growing interest in the research and development of science and technology activities. In 2001 it was rename to Association of University Research Parks (AURP).

As an international nonprofit organization, the AURP represents precisely the leadership in these technology developments, which are designed to promote research institutes in the technology industry, promote innovation, and support technology transfer from these institutions to the private sector.

Over 700 science, research, and technology parks in various stages of development around the world, as well as a variety of universities – whether governmental, nonprofit – and private organizations with a focus on the development and operation of technology research projects and programs comprise the bulk of the AURP's membership.

Members are available to act as providers of goods and services, including planners, architects, developers, and building companies specializing in this highly technical task.

2.4.4.3 Local Alliances

2.4.4.3.1 FIBRA/SESI/SENAI/IEL System

The Industrial Federation of the Federal District (Fibra)[21] has been around for 37 years and was created to bring together one of the most important economic sectors of Brazil's Capital. It currently intends to be the main driver of economic and social development of de Federal District. A strong brand that relies on the participation of 10 industrial unions that account for 10.20% of the Federal District's Gross Domestic Product (GDP). Its goal is to reach 14% by 2014.

It is the driving force of companies that leverages job creation and income distribution. To this end, one of the work fronts was the launch of the Strategic Plan for Industrial Development (PDI-DF) in 2006 – this is an x-ray of the local industry that covers 52 goals and objectives to boost the industrial sector.

[21] Available at http://www.sistemafibra.org.br/ accessed on 03/04/2012

One of the causes advocated by Fibra is open up the international market to the Federal District's industrial sector. To this end, boosting exports is a goal. For the sake of illustration, in 2008, exports totaled US$165,793 million, an all-time record, in comparison with US$81,528 million in 2007. The global financial crisis brought about an economic downturn, but a new increase in exports is expected for the second half of 2009.

Meanwhile, the Industrial Federation works towards attracting investments to the Federal District. Since the ICT sector features prominently in the local economy, FIBRA contributes to establishing the PTCD.

For this reason, Fibra goes on missions abroad and holds meetings of business delegations at the Industrial Federation. The purpose of this exchange is to tap into the opportunities and business available in the federal capital.

Fibra has three major branches to further the mission it has set out to fulfill over these nearly four decades since its foundation. The Serviço Social da Indústria (SESI/DF) [Social Service of Industry] is a brand that is synonymous with social responsibility to industrial workers, and it provides education, health, sport, recreational, and cultural services to society in the Federal District.

On a par with Fibra, the Serviço Nacional de Aprendizagem Industrial (Senai/DF) [National Industrial Training Service] – the vocational education and qualification branch for the local industry – operates at strategic locations across the city, and offers high quality professional training to qualify professionals with the right profile required by the labor market in the Federal District.

The third branch is the Euvaldo Lodi Institute (IEL/DF), which acts as an interface between schools, universities and the industrial sector by offering internships, business training programs and studies and surveys that are in demand by local industrial companies.

Thus, this group of organizations provides an interface with the local economy with the firm purpose of ensuring recognition for Brasilia as a benchmark for entrepreneurship, and not simply as the administrative and political capital of Brazil.

Its mission is to promote competitiveness of the Federal District's industrial sector by creating an enabling environment for production and human and technological development.

In fulfilling its mission, the Industrial Federation of the Federal District is guided by the

following statutory objectives:

- Advocating for the economic segments that form its membership;
- Representing the economic segments with federal and local authorities;
- Fostering strengthening and expansion of the industrial sector in the Federal District;
- Encouraging expansion of technology research and development for the industrial sector;
- Providing technical and legal advice to affiliated unions in matters related to advocacy of the respective segments;
- Seeking and promoting enhancement of quality and productivity in industrial production in the Federal District;
- Developing programs for the appreciation and social promotion of industrial workers;
- Promoting the professional training and qualification of industrial workers;
- Fostering enhancement of business qualification and industrial output of the Federal District.

2.4.4.3.2 SINFOR – Federal District Information and Communications Technology Industry Association

SINFOR[22] is a representation and services unit for members in the industrial sector and member companies associated to the information supply chain, and it also acts as an interface with development institutions, especially those intended to capture and disseminate technology, research and development, qualification and training of human resources, and quality assurance, among others.

SINFOR's mission is to contribute to the continued socioeconomic improvement of the Country. To this end, it provides products and services designed to enhance corporate competitiveness:

- Providing a database on competition;

[22] Available at http://www.sinfor.org.br/ accessed on 03/04/2012

- Situation studies and analyzes; development of scenarios, projections and surveys; capture and dissemination of technology; encouragement to quality certification;
- Instilling an entrepreneurial and exporting culture; engaging business leaders to advocate for their interests, acting as a duly authorized proxy where appropriate; fostering strategic alliances to strengthen business;
- Encouraging creation of a network of partnerships to strengthen competitiveness in the business environment;
- Coordinating and steering outreach activities with the Executive and Legislative Branches in order to influence legislation of an economic and social nature, as well as measures to boost competitiveness; promoting the training of leaders, managers and technical and operational workers;
- Providing technical assistance and brokering consulting services.

SINFOR plays an integrative role in its industry by strengthening and enhancing integration and providing a positive contribution to its competitiveness and business organization. It attracts other sectors in the information technology supply chain.

Its key strengths include:

a) Good relations with the government, the FIBRA System and SEBRAE;
b) Good political representation;
c) A significant number of members in comparison with other organizations, and excellent growth potential;
d) Established at the federal capital, close to the federal government and foreign embassies;
e) World-class members;
f) Good level of entrepreneurs involved;
g) Good sector representativeness at the board, with companies of various sizes and different service and product segments;
h) Representatives in various entities, such as FIBRA, SENAI, FAP-DF, SESI, SDCT,TECSOFT, CDCT-DF, APL-TIC;

i) Transparency and openness towards member companies.

2.4.4.4 Private Universities

The Federal District has an impressive number of universities and private colleges that provides diversified programs at undergraduate and graduate level. However, there are indicators that once graduates find themselves with no work opportunities in their fields they often turn to the civil service admission exams or leave the Capital to seek opportunities elsewhere. This state-of-affairs could change dramatically once the Digital Capital Technology Park is in place. Such private institutions in the Federal District include the following.

2.4.4.4.1 Catholic University of Brasilia – UCB

UCB has been around for 37 years and has been a university for 16 years. It features among the top 10 private universities in Brazil (IGC MEC/2008). It offers 39 classroom-based undergraduate programs, 15 *Stricto Sensu* graduate programs (10 Master's and 5 PhDs) and 26 *Lato Sensu* graduate programs. As far as Distance Education is concerned, UCB offers 16 undergraduate programs, 27 graduate programs and 15 extension schemes. In 2009, it had approximately 770 professors and 13,500 students. Over 5,000 students took the last admission exam held for the first half of 2012.

2.4.4.4.2 Centro Universitário de Brasília – UniCEUB

UniCEUB is also a pioneering educational institution. It has been around for 43 years, and since its founding the Institution has trained approximately 90,000 professionals. It has more than 500 professors and 18,000 students.

2.4.4.4.3 Other Higher Education Institutions and Colleges

Several institutions offer ICT programs in Brasilia, including the two aforementioned

institutions: UCB - Universidade Católica de Brasília, CEUB - Centro Universitário de Brasília, FATE - Faculdade Ateneu, FACIPLAC - Faculdade de Ciência e Tecnologia do Planalto Central, FACITEC - Faculdade de Ciências Sociais e Tecnológicas, FASEP - Faculdade Serrana, FTB - Faculdades Integradas da Terra de Brasília, IESB - Instituto de Educação Superior de Brasília, UNIP - Universidade Paulista, UNIDESC - Centro Universitário de Desenvolvimento do Centro Oeste, UNIPLAN - Centro Universitário Planalto do Distrito Federal, UNIDF - Centro Universitário do Distrito Federal, UNOPAR - Universidade Norte do Paraná, UPIS - Faculdades Integradas, Unicesp - Instituto Científico de Ensino Superior e Pesquisa.

3 EVALUATION CRITERIA FOR POTENTIAL COLLABORATIONS

Organizations and institutions that could collaborate with the PTCD fall into different categories and provide different benefits for the PTCD to be established. This section provides a summary of these benefits and how they could be achieved through the various partnerships listed in the previous section. These benefits may be classed in terms of fostering technological development, product innovation, cost reduction, penetration into markets, competitiveness, scale, funding, and logistical support.

Fostering technological development is about supporting and encouraging research and development activities. The support is primarily of a financial nature, in the form of grants, and counter payment include research and development scholarships, funds for purchasing equipment, payment of third-party services and traveling. Grants are usually provided by public funding agencies at local and national levels.

Partnering with innovative technology businesses and with local universities would help companies at the PTCD to develop innovative products.

Penetration in markets could be aided by trade unions and business associations that bring together different economic stakeholders around a shared goal. Collaboration with these organizations would also provide economies of scale and competitiveness for tenants companies at the PTCD.

Financing at low interest rates is also important to boost the Park's attractiveness, which could be made easier by partnering with organizations such as the BNDES.

PTCD's cooperation with other partners from the public and private sectors at local, national and international level makes it possible to meet the goals in different ways.

Table 31. shows the following criteria for the assessment of benefits from partnerships:

a) Promotion;
b) Product innovation;
c) Cost reduction;
d) Market penetration;
e) Scale;
f) Increase in competitiveness;
g) Funding;

h) Logistics support.

The potential alliances and partnerships and their benefits for the operation of a technology park are quite diverse and hard to predict. Thus, Table 3.1 simply specifies positive indicators as a function of the institutional nature of each entity, even though their management styles, in parallel with the PTCD, has a real potential to generate benefits associated to aspects other than those identified in this table.

Table 3.1 – Benefits from Alliances and Partnerships

Entity	Type	Promotion	Product Innovation	Cost Reduction	Market Penetration	Scale	Increase in Competitiveness	Funding	h) Logistics Support
FAP-DF	Local Government Body	Yes						Yes	
SECTI-DF	Local Government Body							Yes	
SEFAZ-DF	Local Government Body			Yes					
SDE-DF	Local Government Body			Yes			Yes		
Novacap	Semi−Public Corporation						Yes		Yes
CEB	Semi-Public Corporation						Yes		Yes
CAESB	Semi-Public Corporation						Yes		Yes
BRB	Semi-Public Corporation						Yes	Yes	Yes
UnB	Public University		Yes				Yes		
MDIC	Federal Government Body				Yes		Yes		
MEC	Federal Government Body	Yes							
MCTI, FINEP, CNPq	Federal Government Body	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ApexBrasil	Federal Government Body				Yes	Yes			Yes
SUDECO	Federal Government Body	Yes							
Receita Federal (Brazilian Tax Administration)	Federal Government Body			Yes					Yes
BNDES	Federal State-Owned Enterprise							Yes	
Petrobrás	Semi-Public Corporation				Yes	Yes			
EMBRAPA	Federal State Owned Enterprise		Yes				Yes		
EMBRAER	Private Company				Yes	Yes			
BB	Semi-Public Corporation		Yes	Yes	Yes	Yes	Yes	Yes	

Entity	Type	Promotion	Product Innovation	Cost Reduction	Market Penetration	Scale	Increase in Competitiveness	Funding	h) Logistics Support
CEF	Semi-Public Corporation		Yes	Yes	Yes	Yes	Yes	Yes	
SERPRO	Government Organization		Yes		Yes	Yes	Yes		
SEBRAE	Private Organization			Yes	Yes				
Anprotec	Private Organization				Yes	Yes			
ABDI	Private Organization				Yes	Yes			
ANPEI	Private Organization				Yes	Yes			
SOFTEX	Association	Yes			Yes			Yes	Yes
IASP	Private Organization				Yes	Yes			
AURP	Private Organization				Yes	Yes			
Embraer	Private Company		Yes		Yes	Yes			
FIBRA, SESI, SENAI, IEL	Private Organization		Yes	Yes	Yes		Yes		
SINFOR	Private Organization				Yes		Yes		
UCB	Private University		Yes						
UniCEUB	Private University		Yes						

4 ESTABLISHING ALLIANCES

According to Vilkamo and Keil (2003)[10], alliances can be studied from four different perspectives: the motivations behind them; control mechanisms; dynamic issues related to processes; and performance aspects. Vilkamo and Keil (2003) and Hakansson and Sharma (1996)[11] highlight the importance of the history of the inter-organizational relationships to describe alliances, including acknowledgement of a life cycle comprising stages of creation, deployment and completion, which are relevant aspects for studies with a procedural focus.

In this sense, the postulation put forward by Ring and Van de Ven (1992)[12] with the purpose of understanding these relationships from a procedural perspective points to an alternative understanding to the sequential understanding of the life cycle of organizational interactions.

In the view of these authors, development of inter-organizational collaboration is understood cyclically and not necessarily sequentially, and necessarily involves start and end periods. This cyclical nature is not due to stability afforded by a partnership, but maintenance of balance between formal and informal interaction processes. When this balance is altered, collaboration becomes threatened. Developing a relationship under the cyclic model comprises three stages, namely:

negotiation, commitment and implementation.

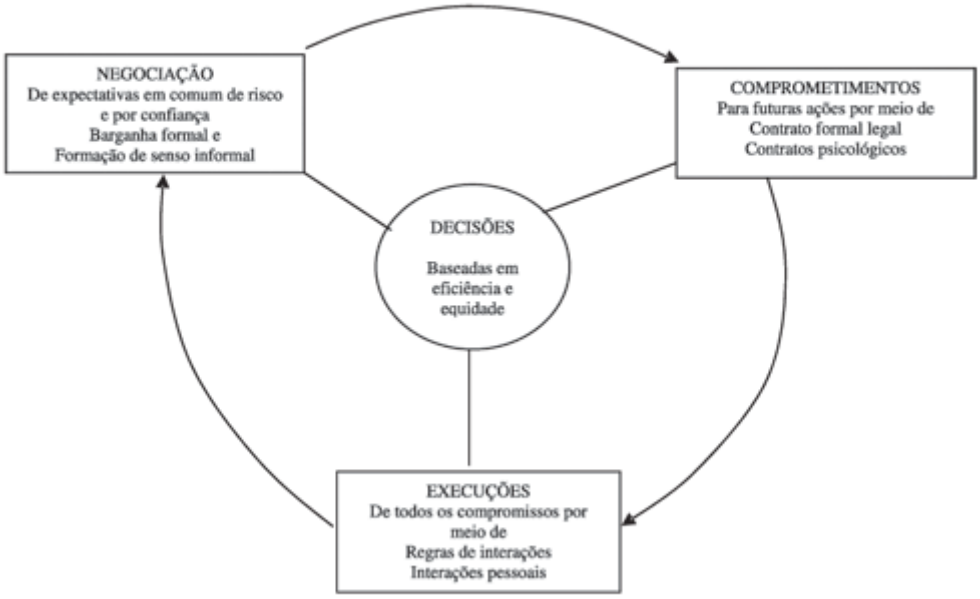
According to Ring and Van de Ven (1994)[13], inter-organizational collaboration relationships are socially constructed mechanisms that are continually shaped and reshaped by symbolic actions and interpretations of the parties involved. Just like the initial structure of safeguards sets the environment for parties to operate, subsequent interactions also rebuild new structures of governance in the relationship. In this sense, according to Ring and Van de Ven (1994)[13], the stages of inter-organizational relationship building may be summarized as follows:

- Negotiation: This is the negotiation of shared expectations regarding motivations, potential investments and identification of uncertainties relating to the relationship to be undertaken between the parties. At this stage, there is focus on bargaining and behavior setting processes as parties select, approach or avoid alternative partners and persuade, argue and haggle about possible terms and procedures for a potential relationship. As a result of these formal bargaining procedures, psychosocial processes take place for the construction or adjustment of meaning leading independent parties to join the relationship. Repeated efforts through formal bargaining and development of an informal

sense are usually necessary to provide the parties with access to the uncertainties involved, the nature and reliability of the individual parties, the rights and duties as well as the efficiency and fairness expected from each counterparty.

- Commitment: commitment between the parties to the alliance in terms of future action takes place through formal and informal contracts. At this time, the terms and the governance structure of the relationship are established through formal relational contracts and/or are informally understood through “psychological contracts” between the parties. As in the previous stage, a series of interactions by the parties is required in order to legitimize mutual consent. Depending on the perceived risk in the business and the intention of the parties having a relationship predicated on trust, many of these commitments are to be achieved informally. Psychological contracts refer to shared expectations and assumptions on the counterparties’ prerogatives and obligations. These expectations about what each party will give and take in the relationship have a varying degree of explicitness, and in general the parties are only marginally aware of the exact nature of these expectations.
- Implementation: This involves implementation of commitments through interaction of organizational roles and interpersonal interactions. At this stage, commitments and rules are carried into effect. The parties give orders to their subordinates, purchase materials, pay the amounts agreed upon and otherwise administer whatever is needed to execute the agreement. At first, behaviors based on formal designations reduce uncertainty when commitments are implemented, thus increasing the predictability of the relationship. From an array of interactions, the people involved become more familiar with each other and may increasingly resort to interpersonal relationships, instead of relationships based on formal roles. These stages in the development of inter-organizational relationships are illustrated in Figure 1.

Figura 1: Fases do Processo de Desenvolvimento dos Relacionamentos Interorganizacionais



Fonte: Adaptado de Ring e Van de Ven (1994, p.08)

4.1 Strategic Alliances

According to organizational strategic views, there are many definitions for strategic alliances. Strategic alliances are means used by independent organizations that come together and collaborate to achieve common goals, based on mutual needs. The allied companies now jointly have access to resources that would not be available if they were operating in isolation. They begin to generate resistive and proactive forces to tackle threats from the external environment in a quest for survival in an increasingly competitive and hostile market.

Strategic alliances are organizational models employed by companies to position themselves competitively. They are arrangements involving related companies that provide gains of sustainable competitive advantage (Sorensen et AL, 1998)[14].

According to Hamel (1991)[15], an alliance can be defined as a short or long term association between two or more companies with shared interests to collaborate because of a mutual need and share skills and risks to achieve a shared goal. Companies decide to set up an alliance for various reasons: access to capabilities, new markets, risk reduction, cost reduction, value creation, etc. They are traditionally perceived as a way to enter new

markets and reduce risk. Porter (1980)[16] identifies cost reduction and opportunities in new markets, as well as reinforcement of the position in existing markets as the primary reasons for strategic alliances. With the prospect of organizational learning and the rapid pace of technological change, however, strategic alliances are often furthered as a means of acquiring expertise and skills for the development new products and services (Pilkington,1999)[17].

Alliances afford access to the capabilities and resources necessary for competitive advantage. They are essential since these capabilities are tacit, and therefore incapable of being transferred through organizational boundaries (Koka and Prescott, 2002)[18]. A great deal of alliances is set up in the high-tech sector, where the emphasis is on acquiring knowledge and learning new skills. Hence, strategic alliances are important vehicles to generate values; cost and risk reduction and access to technology and knowledge drive enterprises to resort to such alliances more and more as a source of competitive advantage (Kotabe and Swan, 1995)[19]. But their likelihood of failure is huge. The inherent problems in alliances are numerous and should be carefully studied and reviewed in order to minimize these risks.

Strategic alliances may be dangerous and ambiguous means. Considering that some authors view this phenomenon as a business strategy, one of the reasons for these risks and challenges is ignorance of the fundamentals of this type of strategy. One such example is failure to appreciate how contradictory it is to learn from a partner while protecting one's information; after all, they could become a competitor in the future. Another example is that, despite the intense relationship advocated by the supporters of alliances regarding the importance of trust to achieve success, the trust that is advocated as necessary is not clear enough between the companies.

This lack of clarity and misinformation generates fear and reinforces the need to understand and explain the complexity involved in establishing and managing strategic alliances between two or more companies.

Matching skills is usually the main goal of an alliance. However, this matching implies potential significant differences in technology, product, market, structure, and objectives between enterprises. It is precisely these differences that could become serious barriers to coordination of product development processes in an alliance.

There are, therefore, numerous factors that cause alliances to fail, including the

following: lack of strategic compatibility in terms of matching resources, incompatible cultures (Kale et al, 2000)[20], mistrust (Kale et al, 2002)[21], a poorly designed alliance (Kale et al, 2002)[21], inability to manage conflicts (Hamel, 1991)[15], lack of formal processes for the efficient exchange of knowledge (Kale et al, 2002)[21], and impact of crises and shocks on the environment of the alliance (Mitchell and Singh, 1996)[22].

It then becomes fundamental to carefully consider and vet a partner, along with the design and organization of this alliance so that risks may be minimized. A network of potential allies exists, who are members of a strategic group; each of these has an experience to share, which will contribute to building a shared strategy (Nohria and Garcia-Pont, 1991)[23]. The profile of the collaborative arrangement is an important factor influencing the post-alliance period (Reuer et al, 2002)[24].

Vetting a partner must go beyond cost-effectiveness considerations. It's a social context, like a network of inter-firm relationships. Companies are conveyors of information flowing through the persons involved in the alliance (Koka and Prescott, 2002)[18]. Thus identifying the level of resistance to the partnership by shareholders and employees is also vitally important (Sorensen and Reve, 1998)[14].

It is essential to identify and select partners that are suitable, strong and in line with business needs. Desirability of an alliance rides significantly on the characteristics of companies: they either boost or damage their reputation on a mutual basis. Successful alliances also depend heavily on the experience of the companies involved with partnerships; an ability to set up and manage alliances is developed, which provides a higher level of success (Anand and Khanna, 2000)[25]. Experience plays a pivotal role in the success of alliances and the skills and capacities afforded by experience help develop strategic alliances.

Today, companies are on the look-out for tools to manage the following phases of the life cycle of an alliance: considering the need for an alliance; selecting a partner; negotiating the alliance; managing the alliance; and terminating the partnership (Kale et al, 2002)[21]. Furthermore, measuring performance is essential to manage an alliance. There are multiples objectives for which companies come together in a partnership: reducing the risks and uncertainties involved in the process; sparing investments for the development of specific skills; plants; access to technology; access to markets and the search for matching assets and expertise/skills (Teece, 1986)[26].

The benefits of a strategic alliance for innovation include access to matching expertise, and reducing risk and uncertainty in the development of products and services (Anand and Khanna, 2000)[25]. Matching skills is usually the main goal of an alliance. However, this matching implies potential significant differences in technology, product, market, structure, and objectives between enterprises. These differences could become serious barriers to coordination of processes in an alliance. In view of the above, to ensure a successful alliance, partners must have systems, structures and processes that are reasonably compatible. Without this compatibility, adaptation costs and the risks associated with the coordination process may be very high (Moffat et al, 1993)[27]. A minimum level of compatibility between the partners is required to ensure matching skills. Being compatible does not mean being equal; it often means being different so a perfect fit between the parties can take place.

Contractual issues and problems in maintaining the partnership are the primary factors leading to failure of strategic alliances (Hakansson, 1993)[28]. In addition, challenges exist with respect to power and control between the two companies. There are two main risks that are inherent to alliances: relationship risks, which are related to collaboration between the partners; and performance risks, which are associated to failure to achieve the desired goals. Alliances between similar companies – the so-called equity alliance in some cases – are capable of reducing relationships risks, and alliances between very different companies – the so-called non-equity alliances – can reduce performance risk (Das and Teng, 1996)[29]. This happens because companies with similar goals and expertise are more likely to have a successful relationship, work in similar ways, and have similar processes in place. However, they do not have the wealth of matching skills that different companies do. This is extremely positive for the performance of new product development, but it causes many internal problems relating to adaptation and changes to work together, often leading to serious challenges in the relationship, even causing the partnership to end. Against this backdrop, it should be noted that partner companies should ideally not compete directly in the same markets. "Global player partners" should be sought, i.e., international companies with markets that do not overlap.

One of the single biggest problems involved in strategic alliances is the dependency that may develop in the relationship between the companies. The way companies enter the relationship has a great impact on the development and future of the partnership.

Uneven power and technology could create a dependency that is far from healthy for one of the companies (Pilkington, 1999)[17]. A company in a condition of inequality should have well defined goals in order to avoid becoming dependent, making the partnership a form of survival, crippling its own expertise and skills, and becoming a shadow of the partner company.

4.2 Strategic Alliances and Learning

Due to the importance of matching skills in strategic alliances, the discussion on learning is paramount. There is fundamentally a need to create new capabilities to build new businesses, projects and products that allow companies to growth and thrive. Despite countless reasons why companies engage in strategic alliances, organizational learning is the single most important reason (Hamel, 1991)[15].

The term “learning process” refers to the various mechanisms by which individuals acquire skills and knowledge, and that make it possible to translate individual learning into organizational learning.

Global competition is the source of asymmetry of knowledge and skills in the corporate world (Hamel, 1991)[15]. This background is also a key factor for the analysis of learning in strategic alliances, especially in international alliances. Understanding the drivers of inter-partner learning is fundamental when it comes to strategic alliances.

Core competencies and value creation through specific skills and knowledge are the real *raison d’être* of a business. Yet core competencies and value creation are not properly distributed across companies (Hamel, 1991)[15].

This is where the important role that strategic alliances can play in the redistribution of these skills and knowledge becomes relevant. Some skills – also known as intangible assets – are extremely costly to be developed internally, not to mention the timing factor, which often drives companies to seek alliances. The fact that some complex skills that are based on tacit knowledge should also be considered – these are the result of unique cultural contexts, and can only be acquired if closely observed and experienced through partnerships.

Alliances create platforms for organizational learning, thus providing access to the skills and expertise of partners (Kogut, 1991)[30]. However, strategic alliances are not

always synonymous with learning and knowledge sharing; often times, companies fail to realize this process since it is not an inherent element of alliances, but a unique strategy that needs to have very clear and well structured goals and methods. The partner company's skills and expertise are usually embedded in some specific output, such as in a product or process, for instance. A company must be able to internalize these skills in order to make them true sources of competitive advantage (Hamel, 1991)[15]. The more similarities the partners have, the greater the need to establish tangible mechanisms for coordination, because the more complex the alliance will be, and the greater the difficulty of having a formal division of tasks (Reuer et al, 2002)[24].

The learning process is more effective where partners are familiar with the new knowledge, companies have compatible standards and values and operational priorities are similar (the dominant logic). Hence, first and foremost there must be cultural compatibility. Furthermore, knowledge creation is greater the more closely related the business of partners is.

It is important that companies have explicit goals and objectives and that they are aware of their own expertise in order to understand their needs and be able to share with their partners. Thus, transfer of knowledge can be leveraged. Absorption of knowledge depends on learning structures and processes that must be formally put in place by companies. Flexibility, adaptability, formal objectives, designated functions, managerial involvement, and training are factors that are positively related to absorptive capacity. Managing these factors is a vital condition to ensure successful strategic alliances.

4.3 Structure and Organization

Early studies on alliances and partnerships dealt with partnerships between developing companies and their suppliers. These long-term relationships currently involve a dramatic flow of information and knowledge and require a great deal of coordination. Clark and Fujimoto (1991)[31] developed four models on the involvement of these partners (automobile manufacturers and suppliers). These models could assist in the early stages of the negotiation for strategic partnerships and are useful to launch reflections on alliances between competitors. The assumption in the first model is that suppliers, based on the concept of a product required by the manufacturer, develop a concept for the part.

Accordingly, suppliers develop and manufacture the parts and sell them to their partner company. Automakers can thus share the costs with their suppliers and these achieve economies of scale. Yet the company has no control over the engineering of these parts. There is a huge need for trust and a very large demand for quality by the suppliers involved.

Under the second model, suppliers do not decide on the concept of the part; this comes straight from the automaker with the required specifications (design, engineering, etc.). The supplier develops a prototype for approval by the automaker. This model allows automakers to use the development potential of suppliers without losing control over the design and completeness of the vehicle. The suppliers, in turn, acquire great skills; developing the prototype helps them detect potential problems and enhance quality. The risk in this model is that the automakers come to rely heavily on their suppliers' engineering capabilities and lose bargaining power; they may also become vulnerable in the long term since they lose expertise in the engineering of parts and then become vulnerable in terms of their technology expertise. Therefore, in this type of relationship is important that companies retain some technologies and know how to manage the alliance in the long run.

Under the third model, the information is concentrated in the hands of manufacturers, who specify and provide details for the design. The selected suppliers have responsibility over the engineering and production process; they are suppliers with production capabilities. This model is great where the company desires to preserve its technological capacity for a specific part, thus keeping their bargaining power and quality. However, the decision to keep part engineering in-house may look damaging as it hinders coordination and removes the company from the focus on the product as a whole. Additionally, the automaker could lose competitiveness to a supplier that is focused solely on the development of that particular part. Finally, under the last model the company and the supplier work on development together. In this case, there is a significant flow of information and communication; engineering teams from both sides come together for joint development. The creative abrasion and matching skills phenomena become apparent and have positive implications for the development of the product. This model drew attention of many scholars and many companies wishing to collaborate not only with their suppliers, but also with companies in the same industry that produce the same products

for the on development of superior products and technology by combining knowledge, expertise and individual skills.

This led to the initial discussions on strategic alliances between similar or competing businesses. Understanding, managing, organizing and structuring this phenomenon is a fundamental condition for the partnership to succeed. In such an alliance, the partners must reach full consensus on rules and approaches. For example, they must agree on financial compensation on the bottom line and on control of the flow of technical information between the companies in order to protect themselves against misuse of information. They must also agree on the division of tasks and the allocation of development efforts between them. The relationship must be transparent and based on trust from the beginning.

In any partnership, there are two levels of relationship: the so-called alliance level – the more strategic, managerial level – and the project level, which is the operational level. The level of alliance involves managerial concerns on the establishment, structure, strategy, and performance of alliances. The primary concern around the level of alliance has to do with the authority, the division of power and results. The project level involves concerns about the approach of the companies in the alliance; it is of an operational nature. The concern at the project level is about the development teams. There are two stages to the development of new products: upstream and downstream (Gerwin, 1999)[32]. The upstream stage involves defining the new product; participants in this stage identify consumer needs, outline the requirements and architecture of the product, select a concept and analyze the product for its economic feasibility. In the downstream stage, participants develop the products as per the architecture developed during the upstream stage. Each company has different inputs in these stages, according to their capabilities. In linear terms, their expertise is felt to a greater or lesser degree in each of the stages. These two stages involve the transaction cost variable, which refers to the costs of negotiating, monitoring and putting performance agreements in place. These costs have a direct impact on the selection of the organization in the strategic alliances for the development of new products.

4.3.1 Factors Influencing Selection of an Organization

Many factors influence transaction costs and, as a result, the selection of organizational alternatives, such as: uncertainty; the uniqueness of human capital; limited rationality; the pressures of time-to-market; the number of times it is necessary to negotiate each project (there should ideally be a one-time negotiation, at least with regard to the general rules, and then the companies come together to discuss other agreements as needed); the safeguard measures for the technical information and the selection of the authority, which implies determining the intellectual property rights (only one of the companies is the author). All of this depends heavily on the symmetry between the partners, transparency and receptiveness to learning.

A company's technical expertise also has a great impact on transaction costs (Gerwin, 1999)[32]. There are three types of technical relationship: the two companies have similar expertise (they can do it by themselves); the two companies complement each other (they need each another); and one of the companies has more knowledge than the other (only one can do it by itself). These differences in technical expertise enable companies to have greater or lesser ability to capture opportunistic situations; e.g. when a company knows more than the other, its perception of opportunism is sharper than its partner's.

As transaction costs affect the structure of projects, there is a need to identify the organizational design alternative for joint development in contractual alliances that is less expensive and costly for companies (Gerwin, 1999)[32]. Upstream alternatives relate to those who have the authority to define a product; downstream alternatives are related to whether they work together or separately. This wealth of knowledge will help identify the most appropriate organizational approach for collaborative development.

4.3.2 Organizational Alternatives

In choosing alternatives for an organizational alliance, the first decision – related to the upstream stage – is whether there will be a single authority (only one partner decides on the products) or dual authority (the partners decide on the products together). This decision establishes who has the final say on strategic choices.

The second decision – related to the downstream stage – is whether partners work together or separately on the development. This decision has a major impact on transaction costs.

It is important to bear in mind that each decision above may be made separately.

4.4 Internationalization of R&D Activities and Inter-Firm Development

The objectives of alliances, along with the right choice of a partner, may be an opportunity for internationalization of research and development. Alliances between companies of different nationalities often provide for great learning of the market, coupled with technological learning.

An important issue is the impact of business internationalization. Mergers, acquisitions and partnerships are transforming the global business landscape; in these firms, product development has also changed to conform to a global perspective. Some global configuration alternatives for product development exist, such as centralized design, where all stages of product development are expressed in a matrix; or, on the other end of the spectrum, integrated collaboration network design, where local offices have authority and independence in the development of products and to collaborate on projects of shared interest. A major trend is a partnership involving two or more independent companies that come together due to their matching skills, which can be tapped into jointly (Mofatt et al, 1997)[27].

Chiesa (1997)[33] defines product development as a collaborative network in the context of R&D capabilities, along with two other collaborative networks: technology development and technical support. Based on this architecture, Chiesa (1997)[33] describes three distinct global structures for development: central model, specialized model and integrated model. Gazzman and Zedtwitz (1999)[34] also put forward a model of global structures with minor variations in relation to Chiesa's (1997)[33]. This model provides the types: centralized ethnocentric model, centralized geocentric model, decentralized polycentric model, global model, and integrated collaborative network model. This internationalization is the source of a need for reorganization, which can be classed according to the dispersion of R&D activities and the degree of collaboration between individual units in the development of new products.

Under the centralized ethnocentric model, all activities are carried out in the home country, which is technologically superior in relation to the countries where their affiliates or subsidiaries are located. Products are created in the central P&D unit and then distributed

to be produced elsewhere around the world. There is high level of control and coordination. The core technology that ensures long-term competitiveness for the company is retained as a “national treasure” in the home country. This model should only be used if all the technology is available in-house, if abundant skills and resources ca be found in the home country, and if the home country does not have major differences in relation to regional markets.

The centralized geocentric model is needed where there is greater dependence on overseas markets and local expertise. The key point is to create internal capacity that is capable of accumulating knowledge of external technologies available and increasing sensitivity to regional markets.

The decentralized polycentric model involves local R&D laboratories in various regions to respond to the adaptations required by the different market niches without a supervision center. Effective coordination is required in this model since there is the risk of redundancy and excessive independence.

The global model involves a central unit with powerful controls so that resources are allocated properly and to avoid redundancies. This unit is responsible for providing training to other units; yet, it is the one that retains technical expertise and intellectual property.

Finally, under the integrated collaborative network model R&D operates as a center of expertise accumulated from all units, which are connected through flexible coordination mechanisms without a central unit for direct supervision. The individual units play strategic roles and functions; there must be synergy between the units whose core competencies are under consideration, thus virtually forming a modular company, and there must also be a sophisticated information technology system.

5 CONCLUSION

Through a coordinative and interdependent effort between TERRACAP’s and the University of Brasilia’s teams, the activities for the development of Product 5.8 were planned, discussed, implemented and documented.

Product 5.8 on Prospection of Alliances and Partnerships provides a survey of

organizations with the potential to establish strategic, tactic and operating collaborations with the Digital Capital Technology Park – PTCD. In addition, criteria for the evaluation of potential collaborations are then proposed, including abilities to foster technological development, product innovation, cost reduction, penetration into markets, competitiveness, scale, funding, and logistical support. Lastly, potential formal processes to establish an alliance/partnership conflict control and risk sharing procedures are proposed.

The activities involved in this stage formally followed the steps in the approach listed for project management – PMP/PMI.

UnB's team believes that they had access to all information necessary for adequate performance of the work, and that the provision of such information by TERRACAP's team, as well as the joint analysis work and discussions, have helped complete the design stage.

Brasília, March 30, 2012.

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