

Definitional Mission to Evaluate ICT Projects in Brazil: Volume 2: Multi-Sector Technology Park

Final Report

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GOVERNMENT OF THE FEDERAL DISTRICT MULTISECTORAL TECHNOLOGY PARK

I. INTRODUCTION

Juscelino Kubitschek, President of Brazil from 1955 through 1960, was a visionary who developed and implemented a Plan of Goals and called for “fifty years of progress in five”. That plan was centered on investment in such priority sectors as infrastructure (roads, electric energy production and distribution, and industry). The construction of a new capital, Brasília, was a goal which in a way summarized the whole plan – it was built in the center of the country and intended to promote national integration and the development of Brazil’s vast interior. Hitherto Brazil’s development had been concentrated on its long Atlantic coastline and a band reaching about two hundred kilometers inland. The new capital forced the relocation of a large contingent of civil servants and supporting service industries and spurred the opening of new highways and other infrastructure investments that resulted in greater national economic integration.

Knowledge and innovation have always been important drivers of human and economic development within Brazil, and they have taken on a larger role in recent decades with the acceleration of technological change and globalized communication and trade. According to a recent report on Brazil and the Knowledge Economy¹, public investment in R&D needs to be made more effective, not just by producing more knowledge and technology but also by providing the infrastructure to commercialize and disseminate new knowledge (for example, technology parks, technology transfer offices, business incubators, and venture capital operations).

Brasília continues to fulfill its fundamental role of promoting the development of Brazil’s heartland, as shown by the rapid economic growth of the Center-West Region and the per capita of the Federal District.

To support this mission of being an agent to promote economic development, the Federal District has a number of resources, such as the best network of public schools in Brazil, universities of national reputation, the highest Human Development Index in Brazil – all of which contribute to making the federal capital an ideal location for businesses producing high quality goods and services with high value added. Thus the Federal District has a special vocation to be a strategic location for establishing a Multisector Technology Park (MTP) that will help attract investments and encourage technology transfer.

In Brazil, the information technology (IT) industries have been one of the most important for generating innovation, for attracting foreign investment and for explaining the high economic growth. Many countries, Brazil included, have looked to copy the example of India since the early 1990s. ²Although it is difficult to completely describe all the factors that accounted for the boom in the exports of IT services in India, there is a certain consensus that two of them were crucial: a much more liberal policy for the import of equipment (hardware) when compared to the earlier protectionism that had characterized the sector; and the creation in 1988 of the Software Technology Parks which had a strong foreign orientation.

¹Alberto Rodriguez, Carl Dahlman, Jamil Salmi, editors, Knowledge and Innovation for Competitiveness in Brazil, WBI Development Studies, World Bank 2008

² André Nassif, National innovation system and Macroeconomic policies: Brazil and India In comparative perspective, Decision Papers #184, UNCTAD, May 2007

II. RATIONALE

Technology Parks have a history dating back to the construction of the Stanford Industrial Park in 1951. Now known as Stanford Research Park, it was the first university-owned industrial park at the time of its founding and played a key role in creation of Silicon Valley. Early tenants included Hewlett-Packard, General Electric, and Lockheed. It is now run by the Stanford Management Company which was established in 1991 to manage the university's financial and real estate assets. The park's 162 buildings hold 23,000 employees who work for 140 different companies.³ Since then thousands of Technology Parks have been established around the world that seek to enhance the competitiveness of companies and entrepreneurs of their cities and regions, and contribute to global economic development through innovation, entrepreneurship, and the transfer of knowledge and technology.

According to Infodev, business incubation emerged as an economic development tool in the early and mid 1980s, first in the US and later in Europe, subsequently spreading around the world. Today, it is estimated that about 5,000 business incubators in the world, depending on definitions and without accurate 'audit' data, of which at least 1,000 are in Asia (approximately half in China), 1,000 in North America, 900 in Europe and close to 400 in Latin America.

There is a worldwide network of science and technology parks organized as the International Association of Science Parks (IASP - www.iasp.ws). According to IASP, science and technology parks "promote the economic development and competitiveness of regions and cities by:

- Creating new business opportunities and adding value to mature companies
- Fostering entrepreneurship and incubating new innovative companies
- Generating knowledge-based jobs
- Building attractive spaces for the emerging knowledge workers
- Enhancing the synergy between universities and companies."

The IASP holds international conferences (one is being held 19-24 September 2008 in South Africa), and a number of presentations will be made by Brazilians. These conferences are major worldwide events where professionals meet, exchange knowledge and information, establish alliances and develop new joint projects. ANPROTEC, the Brazilian Association of Business Incubators and Technology Parks (www.anprotec.org.br) is an Associate Member of IASP, and received a grant from the *InfoDev* Program of the World Bank to strengthen the Latin America Network of Science Parks and Business Incubators Associations (RELAPI) by supporting the consolidation of its mission and advancement of its objectives in the region.

The more successful science and technology parks are close to and associated with universities and/or research institutes and usually have associated enterprise incubators. A wide range of ownership and arrangements exist, often associating governments, private sector enterprises and organizations, and universities.

The Government of the Federal District (GDF) and of its Secretariat of Economic Development and Tourism (SDET/DF) are developing public policies that encourage investment in priority sectors to induce sustainable economic development – sectors such as education, health, infrastructure, energy, transport, logistics, water supply, sewage, and simplification of bureaucratic procedures.

The wide-ranging administrative reform begun in 2007, after the elections, has resulted in savings of a billion *reais* per year to be invested in new projects, allowing the Federal District to develop modern marketing channels to assure the sustainability of economic activities. Following this

³ http://en.wikipedia.org/wiki/Stanford_Research_Park.

policy, SDET/DF sees the need to promote economic feasibility studies for the design and execution of projects.

Technology Parks are a recent feature in Brazil and have predominantly been initiatives spurred on by universities. A few parks focused specifically on a certain area of performance or research (e.g. software), while others combined this focus with that of an incubator. It is these incubator sections that are fostering growth of the parks, recruiting predominantly micro and small companies, though most science and technology parks seek to recruit “anchor” tenants, usually large multinational and Brazilian companies. “Incubators” nurture start-ups (often launched by research scientists from associated universities or research institutes), provide common services that such small firms cannot themselves afford encourage interaction between scientists (often funded by the public sector) and the personnel of private sector enterprises (including larger firms located in the parks), and seek to ensure that this interaction benefits society at large.

According to the World Bank report, Brazil needs to better manage its public R&D and orient it towards meeting broader economic goals. In Brazil scientists often lack experience or business acumen and easily accessible mechanisms need to be created to meet these goals by translating ideas into viable enterprises. The report promotes the use of publicly-funded incubators in technology parks because the its authors see these incubators and parks as being able to make that essential connection between scientists and the business community. The incubators can play a wide range of roles, from matching scientists with businesspeople who can help develop business to providing services not normally available to small firms and facilitating access to finance. In general incubators in science and technology parks have a higher success rate with startups than those located in universities.

The most successful of Brazil’s relatively few technology parks and business incubators are in the states of São Paulo and Rio de Janeiro.⁴ Other successful technology parks are in Recife (Porto Digital) whose focus is in Software and in Porto Alegre in Rio Grande do Sul (TECNOPUC PUC-RS Technology Park), which focuses on IT, Energy, Biotech.⁵

Until recently there has been a lack of parks with technology cluster characteristics or with the presence and investment of relevant players to ensure sustainable growth. The needs are for training in entrepreneurship for scientists and engineers (for example, pairing them with business experts), assistance to develop business and marketing plans, access to early-stage innovation finance and venture capital, assistance in protecting intellectual property, and general help in setting up and “growing” businesses.

Also missing is an attractive value proposal (e.g. infrastructure and incentives package) so that the larger-scale players can locate significant operations in these parks. Finally, they are also financing difficulties for companies building new establishments in Brazilian parks.

According to a recent report by AT Kearney on the Brazilian IT market,⁶ technology complexes or parks should have four main characteristics:

- Be an agglomeration of companies at different stages of development
- Be integrated with an education and research institution
- Take part in joint business-university innovation

⁴ Op Cit Supra at 1, p.132

⁵ “Developing and Strategic agenda for the IT Offshoring Outsourcing Sector” Executive Summary, Funded by Brazilian Association of Information Technology and Communication Companies (Brasscom) and written by AT Kearney Inc.

⁶ Ibid.

- Have non-profit organizational structure

Specific policies and incentives for developing parks are still insufficient. The Ministry of Science and Technology's National Program for Support of Business Incubators (*Programa Nacional de Apoio a Incubadoras de Empresas* - PNI - <http://ftp.mct.gov.br/prog/empresa/pni/Default.htm>), has focused on support for planning, creation and consolidation of incubators and companies and technological parks, is likely to be improved.

The proposed MTP would encourage cooperation and synergy between universities, research institutions, and the private sector and creating a favorable environment for innovation, renovation and training. This should contribute to the competitiveness and economic growth of the Federal District. The MTP would help develop a favorable environment for innovation and the exchange of knowledge, generating synergy, cost reduction, and new business opportunities, while promoting competitiveness, interactions among enterprises, and the ability to conduct high technology business through transfer of technology, thereby increasing wealth creation. The GDF will encourage the businesses locating in the MTP to participate in the international market for goods and services and strive to attract new players to the market.

SDET/DF expects that this project will contribute to the development of the Federal District's economy, generating knowledge, employment, and access to new markets. Thus the advantage arising from the high educational indices can become an effective factor of competitiveness, developing initiatives that make possible business activities based on knowledge. In short, the proposed economic feasibility study will contribute to the design and development of an MTP, presenting essential information for this priority project for the economic development of the Federal District.

III. OBJECTIVES OF THE ECONOMIC FEASIBILITY STUDY

The proposed economic, social, technical, and environmental feasibility study for the MTP of the Federal district has the following objectives.

- Estimate the economic, social, technical, and environmental benefits of a MTP in the Federal District that will host businesses engaged in the commercial exploitation of high technology, with activities that include R&D, production and sales.
- Structure a proposal for financing and implementing the project that will be sent to various international financial institutions, to be indicated by the consultancy. The financial proposals will be developed according the standards established by international organizations and/or development banks.

The objective of the MTP Project is to promote the competitiveness of businesses locating within it, developing a knowledge economy generating growth based on the demand for high- value-added services that are intensive in knowledge and innovation. The MTP will promote synergy among firms through providing common services centers, thereby exploiting economies of scale. Specialized business support units will provide businesses with an environment where they can interact with one another and be near to knowledge creation centers for their mutual benefit. This should allow the MTP to offer more competitive costs for businesses to locate there. The MTP will seek to attract clean, high-technology, knowledge-intensive industries, thereby generating new income and business opportunities.

The feasibility study will provide the SDT/DF with elements for the design, organization, and implementation of the project. The implementation of this project will have a multiplier effect and

lead to other quality investment opportunities and will transform the DF into one of Brazil's principal technological centers, promoting technology transfer, encouraging development of the knowledge economy, and attracting global companies.

A. ELEMENTS OF THE FEASIBILITY STUDY

It is essential that the planning of the MTP be based on studies that analyze the MTP's creation, public and private sector participation, the model of technology park to be adopted, the influence of the project on a range of economic activities, and the cost of implementing the project. The feasibility study should envisage the relation and participation of the state and a private sector party for implementation of the project.

The consultant may wish to partner with a city in the US that has a successful Technology Park to gain and learn from their experience. They may want to look at US cities that have focussed on a particular area of technology they want to focus on and then find a US city interested in twining with them and that would welcome the international connection. One suggestion would be Ann Arbor, Michigan. They have an excellent university and are in the process of setting up a biotech park and technology center.

The study will seek to conciliate the public interest in implementing the MTP with the participation of private enterprise.

SDT/GDF expects the feasibility study to answer the following questions:

- What actions are necessary on the part of the government to implement the MTP?
- What is the best model of technology park for this project?
- What are the strengths, weaknesses, opportunities and threats for carrying out the project (SWOT analysis)?
- What are general requirements for the MTP?
- What are the possible competitors?
- What should be the scope, objectives and opportunities of the Project?
- What is the relevant legislation governing technology parks?
- What would be the socio-economic impact of the project
- What is the necessary infrastructure for establishing the MTP?
- What are the potential flows of goods and services from firms locating in the MTP, and the potential markets for such goods and services?
- What are the supply and demand for goods and services to be produced in the MTP?
- What economic-financial model, including a Public Private Partnership (PPP) under the Federal Law 11.079/2004, would be most appropriate for building and operating the MTP?
- What different players should be involved, e.g. citizens, firms, government agencies?
- How should strategic planning of the MTP be conducted, and the branches of economic activity to be developed in the MTP be chosen?
- What are the possible means to finance the MTP, and what kind of assistance would be available for this purpose?

- What advantages can the MTP offer as an instrument of public policy to promote the development of the Federal District?
- Clear demonstration of the advantages of establishing the PTM?
- What is the magnitude of the investment necessary to make the PTM feasible?
- What are the estimated operational and maintenance costs of the undertaking?
- How should the overall strategic vision of the project be framed?
- What is the best site for the MTP?

Given the priority of the project, the study should be completed within four months from the date on which it is begun.

IV. REQUEST FOR USTDA ASSISTANCE

The feasibility study should meet world-class standards so that international firms with experience in the organization, construction, and management of technology parks will be attracted to compete when the bidding documents for the project itself are prepared. Since firms based in the United States have broad international experience in these matters, SDT/GDF has approached USTDA for technical assistance in carrying out the feasibility study.

V. VIABILITY OF THE PROJECT

H&A ascertained that the proposed project fits well within the GDF's economic and social development strategy for taking advantage of its high level of educational development and the presence of a major research university, the University of Brasília, in the Federal District to move into high technology areas. Excellent educational and health services, high living standards, and cosmopolitan atmosphere due to the presence of embassies and international organizations can help attract highly mobile scientific and technical personnel to the Federal District. A reformed, streamlined, more efficient public administration actively seeks to reduce the cost of doing business in the Federal District. Brasília ranks first among Brazilian states in the World Bank Group's evaluations of the cost of doing business, is a major node in Brazil's road transport system, and has the third busiest international airport in the country, and is developing a system of export processing zones, business incubators, and technology parks.

Figure 1: The Federal District's Digital Capital Technology Park

The GDF has already moved in this direction by launching the Digital Capital Technology Park (DCTP), now under construction on a 132 hectare site near the Granja do Torto summer residence of the President of Brazil (Figure 1). The DCTP is focused on information and communication technologies (ICT) and the GDF expects that the DCTP will generate 80,000 new Jobs in the ICT sector, 20,000 of them direct jobs in the DCTP itself. The DGF has set a target of R\$1 billion and an increase in gross output of the ICT sectors from R\$2.5 billion to reach R\$5 billion in 2014.

DCTP development is being guided by a management group including representatives of the public and private sectors and academia. The goal is to attract four major companies of international stature as well as micro, small and medium-sized enterprises. Land will be made available under concessions from the GDF. The GDF provides operational, administrative, financial, and logistical support to the management group.

The MTP would be the Federal District's second technology park, provisionally seeking to attract Brazilian and international firms in such general purpose technologies as biotechnology and nanotechnology. The precise focus of the MTP would be one of the many issues to be examined in the feasibility study, which is seen as a critical step in the development of the MTP.

The GDF at this stage is seeking a very broad-gauge feasibility study by a world-class consulting firm to help define the most important parameters of the MTP. International consultants with expertise in technology park development are expected to examine a variety of different options for the MTPs development and management, reviewing the experience of leading technology parks around the world, including the United States, Europe, Singapore, Japan and China. GDF missions have already visited One North, Singapore's world-class biotechnology park, the Barcelona Nord Technology Park in Spain, and Technopark Zürich in Switzerland.

On one hand, the MTP is presently in the early stages of conceptualization, and therefore it is hard to say much about the details of its design. On the other, the GDF has shown itself to be eager to receive the best possible advice on a wide range of critical design and management issues, and has indicated that it would be prepared to outsource the construction, management, and operation of the

MTP to a specialized international firm, and this offers important opportunities for US companies in this area.

In North America, the average operating budget for a technology park is about \$1 million, some 20% of all parks have a budget of between \$1-3 million, while 16% have a budget of \$3-10 million, and 7% have a budget of more than \$10 million. Park operations tend to make up close to 100% of the budgets of all the parks.

VI. CRITICAL SUCCESS FACTORS FOR PROJECT IMPLEMENTATION

Following the DM discussions with the H&A prepared a list of critical success factors applicable to projects, assuming the MTP project is to be implemented under either a PPP or a more conventional concession such as provided for in Federal Law 8666, and discussed them with SDET/DF.

Key External Determinants of Success of Technology Parks

- The government shares with the private sector benefits of the MTP's development
- Clear definition of contract objectives for the construction, operation and/or management of the MTP
- Support from top government managers and by the local economic development agencies
- Priority for payments to private sector partner for strategic and critical activities outsourced
- Establishment and application of penalties for non compliance with contract conditions
- The partnership between public and private sides becomes a conventional client and supplier relationship
- Other critical success factors inherent in outsourcing major strategic projects
- Clear direction of leadership and partnership with the University of Brasília (UNB) and possibly other universities and research institutions located in the Federal District
- Access to capital to construct buildings
- Access to equity to assist early-stage companies and start-ups in the incubator section
- Good match between the core competency of the university and the cluster strategy of recruitment of tenants
- Priority access to university resources, facilities, faculty, and students
- Attention to metrics and success stories

Key Internal Determinant of Success

- Availability of multi-tenant space for incubator graduates
- Availability of a formal business incubator
- Physical proximity to the UNB campus
- Presence of research anchor, government anchor, and/or corporate anchor tenants
- Full time staff
- Ability to manage inventory of lots and hold vacant space for expansion
- In-house capacity for partnership development
- Availability of common services (accounting, laboratories, Meeting rooms, fitness facilities, hotels, transportation, recreation, and retail stores.

According to Infodev's Incubator Support Center, Tech parks, and incubators especially need to establish a program for guiding companies in the area of technology by making available laboratories properly equipped with software and tools for developing new technologies, as well as guidance for registering the latter – intellectual property. Some Key Issues they need to look at are?

- Availability of specific types of laboratories?
 - What types of needs do each of the companies have based on their products and the processes to be developed,
 - How will these laboratories be set up?
 - What technical personnel will be available to monitor the development?.
- Availability of software and tools:
 - What types of software and tools will be needed?
 - What technical personnel will be available to monitor the development.?
- Assistance with intellectual property issues:
 - Availability of professionals capable of providing guidance on IP issues and on the registration process.

To determine what services will be offered by the incubator, you must first define at which stage of the enterprises will the incubator offer support. According to Infodev, the process of creating and developing businesses has four distinct stages:

- **Conception:** the entrepreneur identifies a market niche / need on the part of a specific target public and decides to open a company. The focus of this stage is development of a consistent business plan.
- **Emerging Company:** based on the agreed Business Plan, entrepreneurs begin developing the product and/or service to be offered. The objective at this stage is to have at least one prototype of the product to be offered. The legal formalization of the company may also occur in this stage.
- **Consolidation:** Next identify any consolidation in the market in which it has opted to function, with growth in the number of clients.
- **Growth:** as of the company's consolidation, the business will seek out new markets and expand its field of activity

VII. PROJECT RISKS

The following risks have been identified by SDET/DF and H&A:

- The MTP project was conceived only recently and all project parameters are unknown at this time
- The private sector partner(s) could face financial and operational difficulties
- Other risks inherent in outsourcing contracts

VIII. DEVELOPMENTAL IMPACT

Two somewhat differing developmental impacts of the project can be distinguished:

1. a *shorter-term impact* stemming from the results of the study itself that should result in the design and construction of the MTP; and
2. a *longer-term impact* as a result of MTP succeeding in attracting investments by private sector firms locating in the MTP .

Both of these impacts are described more fully below.

Primary Developmental Benefits

Particular primary developmental benefits can be enumerated as follows:

- **Infrastructure:** In the short term, although it will be the responsibility of the private sector partners to put in place the basic infrastructure (e.g. communications systems elements such as fiber, servers, routers, storage capacity, support personnel; common service buildings, equipment and staff; business incubator structures, roads). SDET/DF and more broadly the GDF will have to provide overall guidance in the design of the MTP, arrange for appropriate fiscal incentives, possibly establish an export processing zone and take other actions to support the MTP's development. The feasibility study and the outsourcing of final design, construction, and management of the center will facilitate the process, on a general level by transfer of knowledge and experience, and more specifically, by providing guidance on the design of the MTP and its mode of operation. In the longer term, to the extent that the MTP attracts high-tech companies that make successful investments, the benefits should extend well beyond these companies and their employees to the citizens, enterprises, the government of the Federal District (through increased tax revenues), and could be quite significant. Much of this infrastructure, moreover, could be supplied by US-based sources. (See also Section VI.)
- **Human Capacity Building:** The proposed Terms of Reference for the feasibility study include a task (Task 6) that involves reviewing the organizational preparedness of the SDET/DF to guide the development of the MTP. A particular focus of this task is the attendant human-resource requirements (number of personnel, skill sets, etc.), together with the corresponding capacity-building activities. Indirectly and longer term, successful implementation of the MTP provide important R&D opportunities for the UNB and other DF research institutions, offer high-quality employment for Federal District residents, and stimulate a productive relationship between the academic/research community and the private sector, providing internship opportunities for university students and employment for university and secondary school graduates.
- **Technology Transfer:** In terms of technology transfer, the principal immediate impact will be to familiarize the DGF with best practices in technology park design, construction and management – in the longer term it would be expected that international and Brazilian firms locating the technology park would both transfer existing technologies and create new ones
- **Market Oriented Reforms:** The projects would contribute directly to market-oriented reforms of public administration in the Federal District and Brazil by establishing a vibrant public-private-academic/research partnership and encouraging the development of private sector firms of all sizes.

IX. PROJECT SPONSOR'S COMMITMENT

The MTP project is part of one of the strategic projects of the Federal District: technology parks. Other complementary strategic projects include business incubators and export processing zones (one of each could be included in the MTP), an air cargo hub, a beltway (*anel viário*), and a multimodal logistics center. While the MTP is not yet well structured, it is precisely this issue, how to structure the MTP that the GDF seeks assistance from USTDA. The creation of more technology parks, especially with innovation or incubators, is one of the main recommendation contained in the recent World Bank report on Brazil and the Knowledge Economy and is a priority of all the BNDES, FINEP, ABDI, and is listed in the industrial policy of Brazil, PITCE (*Política Industrial, Tecnológica e de Comércio Exterior*), and the Science and Educational Policy, The goal of the PITCE was to:

- Foster innovation in industry;
- Improve innovative capacity in services, products and processes;
- Enhance the country's technological base in areas that show potential for growth;
- Create a favorable environment for private and public investments;
- Improve the image of Brazil abroad;
- Encourage development of projects guided towards mass consumption;
- Foster employment and income generation;
- Promote a regional development policy;
- Coordinate actions with national institutions, states, metropolitan regions and local governments to achieve policy coherence

X. IMPLEMENTATION FINANCING

The Federal District's contribution will be the provision of a site for the MTP using public lands, support for planning and implementation by SEDT and other GDF agencies, and possibly through the provision of fiscal incentives. The feasibility study would provide options for the construction, operation and management of the MTP, with a view to making it as self-sustaining as possible, minimizing the need for investment of public resources by enlisting private sector firms to undertake most if not all of the required investments to mobilize the current revenues needed to operate the center.

Preliminary estimates are that it will cost at least R\$50 million for the first phase of construction and probably another R\$30 million for a follow up phase.

As for financing of the private partner, the International Finance Corporation (IFC), part of the World Bank Group, is a potential source of funding if the private partner seeks such funding. The private sector arm of the Inter-American Development Bank, the Inter-American Investment Corporation, is also a possible funding source.

The Brazilian government has a comprehensive offer of credit for the IT industry, public-sector lines of credit via the Financer of Studies and Projects (*Financiadora de Estudos e Projetos - FINEP*) and The National Economic and Social Development Bank (*Banco Nacional de Desenvolvimento Econômico e Social - BNDES*). BNDES was originally designed for financing plants, physical capital (machinery, buildings), and along the years have developed procedures and a strong culture in the matter. However, R&D, innovation, services offer for industrial companies, branding etc. was not in its focus, which is why a new agency (FINEP) was created in the 1970s to

finance technological projects.⁷ FINEP is a government-owned agency under the Ministry of Science and Technology that seeks to promote technological development and innovation in Brazil. Its role is to foster support to companies and institutions investing in new products and processes.

In May 2000 FINEP launched the INOVAR Project whose aim is to promote the development of small and medium-size businesses based on technology by designing instruments for their financing, especially venture capital. The INOVAR Project includes: INOVAR Fund Incubator; Brazil Innovation Forum; Brazil Venture Capital website; INOVAR Business Prospecting and Development Network; and Development of capacity building and training programs for venture capital agents.

Until 2005 it was forbidden for private companies to argue for additional resources for science and technology projects; the only possibility was a joint project with a public research institution – FINEP could finance the public partner; the company could then finance its own part by itself. The situation changed due to two new laws that permit public administration to finance science and technology projects in companies, and made easier and simpler for public institutes to make contracts of intellectual property rights with companies in joint projects. FINEP now offers non-reimbursable financing (for non-profit research institutions); Zero Interest (for projects under the new Industrial Policy, with less red tape and focus on small companies); Pro-innovation (for projects under the new Industrial Policy - financing for R&D, innovation and technological training projects).

The Inter-American Development Bank (IDB) was created in 1959 for the purpose of accelerating the economic and social development of Latin America and the Caribbean and today has 46 members. Other than the Bank, the Inter-American Development Group also includes the Inter-American Investment Corporation (IIC) and the Multilateral Investment Fund (MIF). MIF – Multilateral Investment Fund was created in 1993 to further the role of the private sector in Latin America and the Caribbean. Initially worth US\$ 1.3 billion, MIF was given full and flexible power to rapidly meet the demands of the private sector with focus on development. MIF uses both non-reimbursable financing and other investment mechanisms to support small or specific research projects in other directions which act as catalysts for further change. MIF today is the largest source of non-reimbursable technical and financial assistance for developing the private sector in Latin America and the Caribbean.

A. OTHER POTENTIAL PARTNERS OR CONTRIBUTORS TO THE FINANCING OF THE PARK

According to FINEP's website⁸, it has a large number of partners that help it fund the projects it is interested in. The partners are listed below:

SEBRAE - *Serviço Brasileiro de Apoio às Micro e Pequenas Empresas* (Brazilian support service for small and very small companies) is a technical institution supporting the development of small businesses, focusing on fostering and disseminating programs and projects that aim to promote and fortify very small and small businesses. Its purpose is to adopt a strategic, innovative and pragmatic approach to work in order to give the small business world in Brazil the best possible conditions for sustainable development, contributing towards the development of the country.

PETROS - *Fundação Petrobras de Seguridade Social* is the pension fund of the Brazilian

⁷ Mario Sergio Salerno & Glauco Arbix, *The Lisbon Strategy In A Knowledge Society Without Borders: The Brazilian View*, January 2007, Paper prepared for the IEEI (Instituto de Estudos Estratégicos e Internacionais)

⁸ FINEP- http://www.venturecapital.gov.br/VCN_ING/en_parceiros_PL.asp

multinational company Petrobrás and is in the forefront of the private pension market. It offers products and services focusing on security, adapted to the expectations of its participants and sponsors. PETROS now serves some 18 companies in the Petrobrás group sponsors – and their employees – the participants.

ANPROTEC - *Associação Nacional de Entidades Promotoras de Empreendimentos de Tecnologias Avançadas* (Brazilian Association of Agencies Promoting Advanced Technological Projects) is the body representing the agencies that develop programs for technological incubators, parks and complexes in Brazil. The ANPROTEC mission is to combine, represent and defend the interests of the managing bodies of technological centers/complexes, parks and incubators, promoting these models as instruments for the country's development, striving to constantly create and fortify technology-based businesses.

SOFTEX - The corporate mission of *Sociedade para a Promoção da Excelência do Software Brasileiro* - SOFTEX (Society for Promoting the Excellence of Brazilian Software) is to undertake, promote, foster and support innovative work and scientific and technological development of Brazilian software and its applications, through management, technology transfer and promoting human capital with a view to Brazilian social-economic development. The work of SOFTEX and its agents is oriented to promote competitiveness in the software industry, Internet and electronic mail in Brazil and the availability of skilled human resources both in technologies and business in these areas.

CNPQ - *Conselho Nacional de Desenvolvimento Científico e Tecnológico*, (National Council for Scientific and Technological Development) reports to the Ministry of Science and Technology. The CNPq mission is to promote and foster Brazilian scientific and technological development in formulating the national policies of science & technology.

CNI/IEL-The latest institution of the National Confederation for Industry System (CNI), Euvaldo Lodi Institute (IEL) was created in 1969, inspired on the innovative thinking disseminated in advanced countries that the university-industry partnership is fundamental for sustaining the development of the productive sector. Its primary purpose is to promote interaction of the companies in the industrial sector with teaching and research institutions and other organizations based on know-how, with a view to the competitiveness and business and technological development of the productive sector.

B. OTHER PARTNERS

ABCR - *Associação Brasileira de Capital de Risco*, (the Brazilian Venture Capital Association), was founded on 26 June 2000 by 26 founder members to further the venture risk industry in Brazil, to benefit the investors, entrepreneurs, venture capital investors and the economy as a whole.

GAZETA MERCANTIL - is the biggest Brazilian communication and journalism company dedicated to reporting on events affecting on the business world. The Gazeta specializes in economic, business, scientific, and political coverage and covers the whole of Brazil, with special branches in the most important Brazilian states. The Gazeta owns the traditional printed newspaper but also has the investnews.net site that produces news and offers various search and research services on a wide range of market sectors.

ENDEAVOR - is an international non-profit organization that resources of private enterprise to support entrepreneurs in their search for capital, specialized technical know-how and development of their business.

NEW VENTURES - A project coordinated by the World Resources Institute (WRI) – which provides support for the creation of new projects by speeding up the venture capital transfer, permitting further investment opportunities that include social and environmental benefits.

RATIONAL SOFTWARE - Helps companies to develop and install software for e-business, e-infrastructure and e-devices by combining the best practices, software engineering service tools and engineering. Rational presents a single integrated e-development solution that simplifies the process of acquiring, implementing and supporting a comprehensive software development platform, cutting the total ownership cost.

SOMA - *Sociedade Operadora do Mercado de Ativos S/A* is the company responsible for administrating the organized over-the-counter market in Brazil. Its purpose is to offer an electronic environment for negotiating securities and other financial assets to the market.

SOMA is the marketplace where investors can obtain liquidity for their business and choose investment alternatives between technology-based companies another securities with high profit potential.

ABRAPP - 1st International Private Equity and Project Finance Seminar in Latin America – Investor Opportunities provides opportunities for discussions, presenting investment models and getting to know business opportunities. An ABRAPP achievement – Brazilian Association of Closed Complementary Pension Schemes.

BOVESPA -The São Paulo stock exchange (BOVESPA) founded on 23 August 1890, has a long history of services rendered to the capital market and Brazilian economy. It was the first Brazilian stock exchange to install the automated floor, with online real-time dissemination of information (in 1972), and became the largest share negotiation center in Latin America. This prestige culminated in a historic agreement to integrate all Brazilian stock exchanges in a single stock market – that of BOVESPA, which recently merged with the Commodities and Futures Market (BM&F). The two bodies are working in partnership with FINEP to encourage strengthening of Brazil’s capital market as a source of financing to emerging companies, undertaking activities such as holding business rounds between companies and investors and creating support instruments for emerging companies in their process of capitalization and opening of capital.

In 2006, BNDES launched program to finance innovation in companies as well as special lines for bio-fuel development among others priority programs identified ion the Ministry of Trade and Economic Development’s Industrial, Technological and Foreign Trade Policy (PITCE) guidelines. It now is possible to access public sources of financing through direct operations with BNDES favoring small scale companies; access to resources for innovation is simple and quick and a more market-oriented vision is encouraged for developing leading edge technologies and methodologies. BNDES, however, is still a traditional bank looking at physical assets as guaranties and results. It takes some time for changing focus.

The Brazilian government thus has put in place a comprehensive system offering credit for financing innovation via FINEP and BNDES. BNDES offers wide coverage, and there are extensive public-sector sources of finance for the IT sector and for larger scale companies with greater services content (e.g., *Prosoft Empresas* for software companies).

Characteristics of The Main Financing Modalities in Brazil

	BNDES	FINEP	Venture Capital & Private Equity Funds	Commercial Banks
Innovation	■	■		
Risk capital	■	■	■	
Entrepreneurs (start-ups)	■	■	■	
Infrastructure	■	■		■
Human resources	■	■		
Exports	■			■

Sources: Interviews and websites of BNDES, FINEP and BB. Website capitalderisco.gov.br; A.T. Kearney analysis

Developing a technology park normally requires millions of dollars in investments over several years. One estimate that was given to us by Mauricio Guedes, Executive Director of the Rio Technology Park associated with the Federal University of Rio de Janeiro and President of the Association of Brazilian technology parks (Anprotec), was R\$50 million for only the first phase of construction and much more for the future phases.

The common approach to private sector financing and constructing buildings in technology parks is to build on a per-project or per-building basis, depending on what the private sector sponsor is interested in. In North America, only 15% of the parks have used a private-sector master developer to develop the entire park acreage. An even smaller number, 5% are managed and financed by private, for-profit developers. 11% of all parks do their own development.⁹ The Technology Park in Rio de Janeiro, although housed at Federal University of Rio de Janeiro, was privately sponsored by a variety of different private sector donors, of which Petrobrás, one of Brazil’s more successful multinational companies, was the most important. There was no one Master developer for this park.

XI. US EXPORT POTENTIAL

A. Estimation of Export Potential

To estimate the potential for US exports that could eventually be created by the MTP project, it is necessary to resort to certain assumptions, namely:

- The feasibility study results in the successful implementation of the MTP).
- The MTP will require substantial new investments in roads, parking areas, buildings housing common services for Park tenants (especially small and medium firms), information infrastructure (e.g. in fiber, routers, servers, storage media); and laboratory, scientific and other equipment used in research as well as in software and consulting services. The magnitude of the investment required will have to be estimated during the feasibility study.

⁹ Characteristics and Trends in North American Research Parks: 21st Century Directions, Battelle Technology Partnership Practice in association with the Association of University Research Parks, Battelle Memorial Institute, 2007

- The amount of physical ICT infrastructure to be deployed, including Internet, logic network, servers and software libraries for shared use. The physical infrastructure is a crucial factor for the support provided by the incubator that underpins the development of ICT enterprises. The MTP and the incubator need to provide the entire infrastructure required by the new enterprise.

There are further uncertainties associated with the estimation of the resultant export potential, most notably, the cost of the MTP construction and initial investments by firms locating there over the first years of the project which might be on the order of US\$1 billion, as estimated by the sponsors of the DCTP for that park

Because the costs are so situation-specific, it is extremely difficult, if not impossible, to make more than order-of-magnitude estimates about the aggregate value of imported materials, equipment, and software for construction of the MTP's infrastructure, common facilities, and initial tenants' buildings and equipment. Still, it seems reasonable to assume that the investment in scientific equipment, telecommunications facilities, hardware and software should not be less than US\$200 million, of which at least half, US\$100 million, would be procured from US suppliers.. Thus we estimate the total market for US suppliers for the projects at no less than US\$100 million, probably considerably more.

Moreover, a number of US ICT firms, such as Certisign, Cisco, Dell, HP, IBM, Oracle, Sun Microsystems, and many others have been supplying services, software, integration, and equipment to the Federal District for the existing GDF facilities. Should this project go forward, these companies, as well as others, would stand to benefit.

Potential US Suppliers

The range of state-of-the-art technologies that may be engaged in technology park development is quite large, and will depend on the kinds of research that the future tenants plan to conduct there. At a minimum, it includes the following:

- Optical fiber cable
- Servers
- Storage media
- Chips
- Desktop PCs
- Storage area networks (SAN)
- Server switches, routers, HBA
- Software, particularly security (anti virus/spam/hackers), database, server. e-mail, and datacenter management software
- Backup power generators
- Air conditioning equipment
- Scientific software
- Scientific and lab equipment for biotechnology, nanotechnology and other high-tech industries, such as bio-hoods, rotary shakers, Orbital Incubator Shakers, Laboratory Incubators, Ovens, Sterilizers, Seed Germinators, Deep Freezers, Incubator Shakers, Deionizer, Distillation Plants, Laminar Flows, Fume Hoods, Rotary Shakers

Identification of specific US suppliers is complicated because a considerable number of companies supply the technology park market. For example in servers, IBM, HP, Dell, Sun, Silicon Graphics,

Cubix, Aspen Systems, and Dell come to mind, but there are many more specialized producers. For Laboratory and Scientific equipment, the following 11 companies come to mind: Agilent Technologie; Millipore; Becton Dickinson; Amersham, Part of GE Healthcare; Thermo Electron, Thermo Fisher Scientific; BioRad; Invitrogen; Molecular Research Center, Inc; Cyto Pulse; PRO Scientific; LifeSpan, etc

Many if not most of these suppliers are active multi-nationally and have networks partners for sales.

XII. FOREIGN COMPETITION

US companies are clearly dominant in the market for ICT hardware, software, and services (including outsourcing) as well as in telecommunications equipment, but these firms face increasing competition from European and Asian suppliers and manufacturers. China and India are the big powerhouses for biotechnology equipment and suppliers, but there are also some strong European, and Canadian suppliers as well. A USTDA financed feasibility study for the GDF would help US suppliers get in at an early stage in the development of a new market for high technology equipment in the Federal District and potentially other states.

XIII. IMPACT ON THE ENVIRONMENT

The proposed Federal District MTP project is unlikely to have any significant negative impact on the environment, and a license for operating the Digital Capital Technology Park (DTCP) has already been issued by the federal environmental agency, IBAMA. Nevertheless, the proposed feasibility study will include an environmental impact assessment.

XIV. IMPACT ON US LABOR

Funding for the MTP project will result in the creation of US jobs as major software integrators, hardware, and scientific equipment items are purchased from US manufacturers, and if a US firm is chosen to manage and operate the MTP. This could be directly if a US firm or its Brazilian affiliate becomes the private sector partner (or member of a consortium), or indirectly if a Brazilian or even a European or Asian firm were to be the partner, since US suppliers are strong competitors in the market for high-technology equipment, software, and consulting services. If USTDA finances the initial feasibility study and the contractor works closely with the US firms that expressed interest in this project, the likelihood of an increase in US jobs is even greater.

Financing this feasibility study and the actual execution of the MTP project will not result in the transfer or displacement of US jobs to the Federal District or other states. The feasibility study is designed to facilitate communication and cooperation between the GDF and the private sector both within the Federal District and more broadly, in Brazil, as the definitional mission conducted for by H&A already has had this effect. Moreover, USTDA financing of this feasibility study could, however, be used to assist in the development of an export-processing zone and might have a negative impact, direct or indirect, on US jobs.

XV. QUALIFICATIONS OF THE CONSULTANT TEAM

General Qualifications of the Consultant Team

As is evident from the accompanying Terms of Reference (MTP TOR; see Annex I), the proposed TA is multidisciplinary in nature. Accordingly, the skill sets and expertise of the Consultant Team are expected to be diverse. The following general attributes on the part of the Consultant Team are

considered critical to the successful outcome of the Technical Assistance for a detailed feasibility study of the project:

Technology park specialists

- Experience in the design, construction, and management of technology parks and related facilities.

Specialist in Brazilian public budget finance project analysis

- Knowledgeable in Brazilian public budget finance, competitive bidding and public contracts

Specialist in project analysis

- Expertise in the economic and financial analysis of projects and feasibility studies involving high technology industries and technology parks

Economists

- Expertise in urban and regional planning
- Expertise in analyzing economic impact of high-technology industries

Team Composition and Experience

In terms of the composition and particular credentials of the Consultant Team, it is judged that the team should consist of the following:

- One (1) Team Leader with experience in design, construction and operation of technology parks
- One (1) International technology park specialist
- One (1) Brazilian technology park specialist
- One (1) International economist
- One (1) Environmental Specialist
- One (1) Brazilian economist
- One (1) Brazilian Government Budget analyst/local liaison
- One (1) Brazilian Project/Financial Analyst
- One (1) Procurement Specialist
- One (1) Project Coordinator

More specific descriptions follow.

Team Leader:

- At least fifteen (15) years' experience in the technology park design, construction, and management
- Both a US and an international perspective on the technology parks, with the international perspective preferably gained through on-the-ground project work
- Management, organizational and cross-cultural skills and perspective to structure, oversee and carry out the Feasibility Study effectively
- Ability to communicate findings effectively and to liaise appropriately within the SDET/DF framework and with other stakeholders, including other Federal District public sector entities, academic and research institutions, and potential private sector partners

International Technology Park Specialist

- At least ten (10) years' experience with technology parks, including hands-on experience with design, construction, and management of technology parks
- At least five (5) years' international experience with technology parks, preferably in significant emerging economies
- At least 5 years experience with high-technology business incubators

Brazilian Technology Park Specialist

- At least three (3) years' experience with the design, construction, and management of Brazilian technology parks, Experience in defining and monitoring service level agreements (SLAs) for ICTs
- At least five (5) years' international experience with technology parks, preferably in significant emerging economies
- At least three (3) years experience with high-technology business incubators

International Economist

- At least 10 years experience in urban and regional planning,
- At least 5 years of international experience in developing countries
- Expertise in analyzing economic impact of high-technology industries

Environmental Specialist

- Experience in social and in environmental assessments of projects in developing countries
- Experience with donor-funded environmental and social performance standards and their interpretation, specifically those of the IDB and the World Bank.
- Ability to assess and guide the Government in developing environmental and social action plans and assessments that comply with all local and federal laws as well as World Bank and IDB rules.
- Fluency in Portuguese would be an advantage

Brazilian economist

- At least 10 years experience in urban and regional planning,
- At least 5 years of international experience in developing countries
- Expertise in analyzing economic impact of high-technology industries

Project Coordinator

The responsibilities of the Project coordinator include, but are not limited to, the following:

- Basic support logistics for everyone on team and their support people to ensure a smooth running of the project, such as deliverable coordination (formatting, timeliness, and other coordination),
- Travel coordination,
- Arranging workshops and conferences in person and by telephone.
- Managing and editing of deliverables, thereby ensuring that the deliverables closely follow the scope of work outlined. This way there are no surprises.

- Reviewing, coordinating and distributing presentation materials, both the electronic and paper versions of presentations.
- Developing and creating a library of resource material so that all consultants have easy access to any resource material, 24 x7, maintaining the library
- Arranging housing and payments for project related expenses,
- Coordinating with Project Manager on Project Finance issues such as expense payments, consultant time
- Arranging logistics for conferences and workshops
- Ability to speak and write Portuguese and English

Brazilian Public Budget Analyst:

- Duly qualified/accredited Brazilian expert with extensive knowledge of Brazilian government budgetary processes, competitive bidding and public contracts
- Familiarity with Brazilian federal, state and municipal public IT enterprises in Brazil
- Ability to serve as local liaison, set up meetings (secretarial service available)

Brazilian Project Analyst

- Expertise in the economic and financial analysis of projects and feasibility studies involving technology parks
- High degree of fluency in English would be an advantage

Procurement Specialist

- At least five (5) years expertise in procurement processes, compiling and writing proposals and bidding documents (*editals*)
- Familiarity with IT, Telecom and Technology Parks
- Familiarity with the purchasing process
- Fluency in Portuguese would be an advantage

In practice, it is unlikely that the backgrounds of the team members will fit the above profiles exactly. However, the collective qualifications of the Consultant Team should correspond to those described. If a proposed Consultant Team offers a comparable skill set but with a different distribution, or a basic arrangement different from the four-member team plus Local and Brazilian staff described above, it must be clearly demonstrated how such a team can efficiently carry out the full scope of the Feasibility Study.

A. Suggested Evaluation Criteria

It is suggested that the selection of the Contractor for both of the studies be based on the following criteria:

CRITERION	Max. Points
Expertise and skills of proposed personnel	50
Proposed approach to the TA and to the individual tasks	30
Pertinent international experience and cross-cultural skills	20
Total:	100

XVI. JUSTIFICATION

As this report has documented, the GDF has made technology parks a strategic priority, and has already begun construction of one, focused on the ICT industries. The Federal District has basic scientific, technological and education base necessary for the development of other high-technology industries, and has moved aggressively to create a modern and efficient public administration. Many GDF officials have been drawn from the private sector and they are keenly aware of the need to create a positive environment for private sector business. They are open to creative partnerships with the private sector to attain strategic government objectives. The MFP would be an excellent demonstration of this approach to public policy and private sector partnerships. It is also accelerating its development of e-government.

Moreover, the involvement of a US-based Consultant Team in carrying out the proposed feasibility studies should work to the advantage of US-based suppliers of electronic and communications infrastructure for the MTP and scientific equipment for the common facilities and private sector enterprises locating there, as well as those involved in the design, construction and operation of technology parks. These suppliers are strong in the major technological areas but face growing competition from foreign suppliers. H&A believes that initiatives to develop the MTP present a significant export opportunity for US suppliers (see Section VI), and even more so if the GDF project generates an interest in similar projects in other Brazilian states and even the Federal Government.

Accordingly, H&A believes that funding of the feasibility study on behalf of the SDET/DF would represent a good use of USTDA resources.

XVII. TERMS OF REFERENCE

The proposed Terms of Reference for the proposed datacenters Feasibility Study are attached as Annex I.

XVIII. BUDGET

The suggested Budget for the proposed Technology Park Feasibility Study is attached as Annex II

XIX. RECOMMENDATIONS

H&A recommends that USTDA fund the Technology Park project under the conditions set forth in the TOR at a budget level of \$506,825.

XX. CONTACTS

A complete list of persons and institutions contacted in the conduct of the DM is included in Annex III.

ANNEX I: TERMS OF REFERENCE FOR THE MTP PROJECT

TASK 1: PREPARATION AND BACKGROUND RESEARCH

The Contractor shall research the Brazil ICT, science, education, and research sectors. This would include background information on various IT, technology, science, and education programs.

TASK 2: INITIAL VISIT AND ASSESSMENT OF CURRENT SITUATION

The consultant team members shall travel to Brasilia to familiarize themselves with the current situation and to meet with the Project's Sponsor, GDF. The consultant should also visit the successful Tech parks highlighted in the World Bank and AT Kearney Reports in Rio de Janeiro, Sao Paulo, and Porto Alegre in Rio Grande do Sul and learn about their operations, management, experience, and the incubator programs.

The contractor should already be familiar with the Federal PPP legislation, Science/technology and industry policy initiatives of PITCE, FINEP, ABDI, as well as Governmental public budget finance and project analysis.

TASK 3: CONDUCT A NEEDS/REQUIREMENT ANALYSIS FOR THE MULTI-SECTOR TECHNOLOGY PARK

In this task, the contractor will create a needs analysis and requirement document that will be used in Task 4 to create the business model.

Deliverable: Needs and Requirement Assessment document

TASK 4: DEVELOP FUNCTIONAL SPECIFICATIONS, ARCHITECTURE, AND BUSINESS MODEL

The contractor will:

- Analyze the findings from Task 3 and develop specifications regarding the architecture and design of the MTP
- Develop more precision in the estimates of network designs, equipment needs and capacity, and resulting capital expenditure and operating costs need for the broadband infrastructure for the complex.
- Create detailed operational model of the Technology Park and resulting data network, the management and security of the network and Park, the services needed.
- Technological Definition
 - Analysis of the technological environment available and of related trends.
 - Define the transfer of knowledge for the implementation team.
 - Define essential technical conditions and options for the project,
 - Define Project Metrics, performance, and other benchmarks to be used
 - Define Technological Standards to be followed
- Provide a list of potential US Suppliers interested in participating in the network

The main task here is to find a way of sharing the fruits of technological change with all parties in an equitable way. The contractor will illustrate and describe how this goal will be accomplished; what type of framework agreement will be used to introduce new technologies and products in the future so that all parties can share in the introduction of new technologies; and lastly, what type of

pricing formula for will be used to cost out these new products and lower the cost old products and services that will provide the most comfort to each party.

The contractor will design and develop a business model that takes into consideration the rapid and continuing technological evolution and convergence in the communications sector and its impact on the costs, pricing, and development of services. This model will include some type of mechanism that make it possible to plan for technological change at least 10 years into the future, enabling the private sector partners to make the necessary investments without fearing being trapped into a situation of sunk costs, while assuring the government that, even though technological advances, paradigm shifts, etc cannot be accurately projected.

Deliverable: Design, Technology Definitions, Business Model & Framework Agreement

TASK 5: ECONOMIC AND FINANCIAL ANALYSIS OF THE MTP

The Contractor will:

- Prepare estimates for rates of return for the Park's initial investment costs, including the embedded data transmission, control and storage network and for common services buildings and conduct scenario analysis of trends, project risks and total cost.
- Quantify the estimate for the amount of counterpart funds needed to be supplied by the GDF
- Analyze the budgetary and financial impacts of the Project
- Estimate the amount of investments (including the import content) by potential tenants over the first five years of the MTP's operations
- Assess all aspects of project feasibility (technical, economic, financial, political, legal and organizational) and their interrelations
- Prepare economic scenarios, risk analysis, rate return analysis, analysis of total cost of operation for the first five years of MTP operations.
- Quantify the economic development benefits to the region

Deliverable: Report on economic and financial analysis and interrelationships

TASK 6: ORGANIZATIONAL ISSUES

To support the development of a professional human resource function designed to be an effective source of capacity building. As GDF is the sponsor of MTP project, the consultant in this task needs to help design the organizational structure and requirements that would meet the needs of the projects in overseeing a privately operated entity.

- Identify and prioritize corporate governance issues that are necessary and critical to support the Business Plan
- Define the qualifications of the staff needed to carry out the project.
- Define the respective roles & relationships of the staff to the University, Government, or Corporate anchor tenants
- Identify the necessary support resources needed for work plan implementation in Task 10, i.e., the development of the remaining tasks and phases
- Create a mechanism for GDF to make use of these available resources use these resources or personnel
- Define the corporate governance structure

- Establish metrics and benchmarks
- Review current human capital deployment
- Identify opportunities for improvement of corporate governance structure
 - Barriers to success, both external and Internal
 - Keys to Success
- Foster Knowledge Transfer and Capacity Building
 - Help prioritize training professional development needs and implement a regular training schedule
 - Help create communities of practice, by encouraging the sharing of knowledge and information with staff members doing the same type of job, or staff members on different technical committee, as well as staff that previously worked in their areas, to share information, failures, and successes.

Deliverable: Human Resources, Knowledge Transfer, and Capacity Building Plan

TASK 7: CONDUCT A PRELIMINARY ENVIRONMENTAL ASSESSMENT

- Conduct a preliminary review and evaluation of the expected environmental impacts and their compatibility with both local regulations and the requirements of potential lending agencies, especially the World Bank, the IFC, and the IDB.
- Discuss how any potentially significant negative impacts can be minimized.
- Identify Agency/Department expectations priorities, opportunities, and trends,
- Analyze the environmental impact on legislative and judicial branches of government and other levels of government (Federal and Municipal).
- Verify possible transfers of effects, identify and adopt preventive measures and actions to obtain synergies with other departments and Agencies involved
- Develop plans for full environmental impact assessment in anticipation of the Project moving forward to the implementation stage.

Deliverable: Preliminary Environmental assessment report

TASK 8: DEVELOPMENTAL IMPACT ANALYSIS

The Contractor should identify and assess the developmental outcomes that would be expected if the Project is implemented in accordance with the recommendations of the Study. The Contractor should focus on estimating the Project's potential benefits in any or all of four areas: additions to infrastructure or industrial capacity; nature and effects of any legal/regulatory changes resulting from the Project; expected human capacity building; technology transfer and its effects. The analysis of potential developmental benefits should be as concrete and detailed as possible and include at least one specific example of developmental impact for each area that is relevant for the Project. Any significant developmental impacts outside the four areas listed above should also be included.

Deliverable: A report setting forth the findings and opinions as specified above.

TASK 9: PROJECT PLANNING AND IMPLEMENTATION

The Contractor will assess and determine whether the critical success factors for project implementation have been met and the project risks identified have been accounted for and

mitigated to the extent possible. The contractor will also review the HR Capacity Building, Knowledge Transfer, and Training Plan proposed in Task 7 and incorporates these recommendations into the implementation plan. The contractor will also create options for property, management, and operation of the network.

The Critical success factors are the following:

- A successful change management process be conducted in the affected secretariats and government agencies
- Training of state personnel in the management of outsourcing, Service Level agreements for the data network, etc.
- Clear definition of contract objectives (scope, service levels, metrics, requirements, etc.)
- Support from top government managers
- Establishment and application of penalties for non compliance with contract conditions
- Definition of a clear process exiting from the contract and transition to another supplier
- The partnership between public and private sides becomes a conventional client and supplier relationship
- Other critical success factors inherent in outsourcing processes for IT

The Project Implementation Report will recommend the most appropriate structure for the project, summarize the steps that need to be undertaken by the government to implement the Project according to the recommended structure, and analyze any regulatory or other steps involved with the creation of any new legal entity that may be required.

TASK 10: PREPARATION OF TOR FOR A BIDDING DOCUMENT

The Contractor shall prepare one or more bidding documents (*Editals*) that cover all of the goods and services needed for Project implementation. The U.S. Firm shall prepare the *Edital(s)* in consultation with the Grantee. The Contractor also shall develop a timetable for publicizing the *Edital(s)*, and for awarding the contract(s) for the goods and services covered by the *Edital(s)*. Every *Edital* must be fully consistent with the legal requirements of Brazil.

Deliverable: Complete draft of the *Edital(s)*, ready for publication. The U.S. Firm shall provide copies of the *Edital(s)* in both English and Portuguese.

TASK 11: PRESENTATION, APPROVAL FOR PUBLICATION, AND FINAL REPORT

Upon concluding the preparation and publishing of the project *edital*, the Contractor, while still in Brasilia will formally present to GDF the findings and recommendations and a near final version of the report. The Grantee will be able to use this opportunity to ask questions or provide further comments and suggestions based on the presentation and draft of the Final Report.

After the Presentation, the contractor will make the final changes suggested by the Grantee and submit the Final Report to both the Grantee and to USTDA. The Contractor shall ensure that the Final Report is a substantive and comprehensive report of all of the work performed in accordance with these Terms of Reference for Phase II, including all deliverables. The Final Report must be prepared in accordance with Clause I of Annex II of the Grant Agreement. The Contractor must identify prospective U.S. sources of supply in Final Report to be submitted to the Grantee and USTDA in accordance with Clause I of Annex II of the Grant Agreement.

The Final Report shall be a comprehensive document covering and synthesizing the findings of all the preceding tasks, GDF with the appropriate information, recommendations and guidelines. In the event that the Final Report contains confidential information, or information not yet made public, the Consultant Team shall take appropriate steps to ensure that sensitive information is not released inopportunistically.

Deliverable: Draft Final Report and Presentation

Notes:

- 1) **The U.S. Firm is responsible for compliance with U.S. export licensing requirements, if applicable, in the performance of the Terms of Reference.**
- 2) **The U.S. Firm and the Grantee shall be careful to ensure that the public version of the Final Report contains no security or confidential information.**
- 3) **The Grantee and USTDA shall have an irrevocable, worldwide, royalty-free, non-exclusive right to use and distribute the Final Report and all work product that is developed under these Terms of Reference.**
- 4) **All deliverables shall be supplied in the English language. Additionally, the Final Report and presentation shall be translated into Portuguese. The U.S. Firm shall ensure the quality and accuracy of the translation.**

ADDITIONAL COMMENTS

Comment 1: Successful execution of the FS presupposes that 1) the Consultant Team establishes a close working relationship between the Consultant Team and the GDF 2), that the team is prepared to spend the necessary amount of time on-site in-country; and 3) the consultant team has appropriate access to government officials and personnel, resources and data. Successful performance of the FS is obviously dependent on full and timely availability of the resources in question. It is expected that candidate firms for carrying out the FS will address these issues in their proposals, both in general terms and in terms of specific requirements (e.g., for desk space, phone/fax, Internet connection).

Comment 2: Below are three possible local consultants who are experts in the industry and who might be interested in working with the US-based consultant team.

Mauricio Guedes
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ExPresident of ANPROTEC

Vanda Scartezini
Director
Pólo Consultores Associados
Alameda Santos 1470 cj 1407
São Paulo - SP
Brazil

Brazil Multi-Sector Technology Park

Hellerstein & Associates

+55 (11) 3266.6253
vanda@uol.com.br

Former National Secretary for National Secretary for Industrial Technology in Ministry of Science and Technology and National Secretary for IT in the Ministry of Science and Technology, and former President of the National Institute for Industrial Property (equivalent of US Patent Office).

Roberto Spolidoro
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Effective dean of Brazilian science and technology park professionals. Active in the field for some 30 years.

ANNEX II: BUDGET FOR THE MTP PROJECT

ANNEX III - SECTION 18

Technical Assistance To Brasilia for the Multi-Sector Technology Park-Summary				
Table 1				
<i>(Breakdown of labor costs by task in Table 2)</i>				
DIRECT LABOR (DL) (*)	NAME, TITLE & LABOR CATEGORY	DAILY (8HR) RATE	# PERSON DAYS	TOTAL
	Team Leader	\$1,300	75	\$97,500
	International Technology Park Specialist	\$1,300	86	\$111,800
	International Economist	\$1,300	28	\$36,400
	Environmental Specialist	\$1,100	22	\$24,200
	Brazilian Technology Park Specialist	\$900	49	\$44,100
	Brazilian Economist	\$900	26	\$23,400
	Brazilian Govt Budget Analyst	\$750	18	\$13,500
	Brazilian Project Analyst	\$750	25	\$18,750
	Procurement Specialist	\$ 1,100	14	\$15,400
Total			343	
OTHER DIRECT LABOR	Project Coordinator	\$1,000	42	\$42,000
TOTAL DIRECT LABOR				\$427,050
OTHER DIRECT COSTS (ODC)				
International Travel	US-Brasilia	1500	7	\$10,500
	Brasilia-Rio	175	2	\$350
	Rio-Sao Paulo	150	2	\$300
	Sao Paolo-Porto Alegre	250	2	\$500
	Porto Alegre-Basilia	300	2	\$600
Ground Transportation	Brasilia	1000		\$1,500
	Rio	150		\$150
	Sao Paolo	150		\$150
	Porto Alegre	150		\$150
PER DIEM -\$ Staff	Brasilia 150 days@271	271	150	\$40,650
	Rio 3 days @348	348	3	\$1,044
	Sao Paolo 3 days @251	251	3	\$753
	Porto Alegre 3 days@201	201	3	\$603
Local Brazilians	Rio 3 days @348	348	3	\$1,044
	Sao Paolo 3 days @251	251	3	\$753
	Porto Alegre 3 days@201	201	3	\$603
OTHER				
Visas		125	5	\$625
Communications				\$750
Translation				\$18,000
Supplies, Copy & Reproduction				\$750
TOTAL OTHER DIRECT COSTS (ODC)				\$ 79,775
TOTAL BUDGET				\$ 506,825

Notes:

(*) Labor rates for each specialist and/or subcontractor contain no mark-up for holidays, vacation, or sick-leave.

Assumptions:3 round trips for Team Leader, 1 trip for the Tech Park specialist, 1 for the Economist, 1 for the environmental specialist, 1 for Procurement Specialist

Per diems are equal to total estimated in-country days of US Consultant Team. Per diem rate is based on the US Government rates

Rates shown are taken from the US State Department website: http://aoprals.state.gov/web920/per_diem_action.asp?MenuHide=1&CountryCode=1042

Cheap Fares to Brazil can be obtained through BACC Travel at 1800-222-2746 (www.bacctravel.com)

Technical Assistance To Brasilia for the Multi-Sector Technology Park				
Table 2 -- Breakdown of Labor Costs per Task				
<i>(Total Costs in Table 1)</i>				
DIRECT LABOR (DL) (*)	NAME, TITLE & LABOR CATEGORY	DAILY (8HR) RATE	# PERSON DAYS	COST
Task 1				
Preparation & Background				
	Team Leader	\$1,300	7	\$9,100
	International Technology Park Specialist	\$1,300	4	\$5,200
	International Economist	\$1,300	3	\$3,900
	Environmental Specialist	\$1,100	2	\$2,200
	Brazilian Technology Park Specialist	\$900	3	\$2,700
	Brazilian Economist	\$900	1	\$900
	Brazilian Govt Budget Analyst	\$750	1	\$750
	Brazilian Project Analyst	\$750	1	\$750
	Project Coordinator	\$1,000	4	\$4,000
Subtotal Task 1			26	\$ 29,500
Task 2				
Initial Visit & Assessment				
	Team Leader	\$1,300	7	\$9,100
	International Technology Park Specialist	\$1,300	20	\$26,000
	International Economist	\$1,300	5	\$6,500
	Environmental Specialist	\$1,100	5	\$5,500
	Brazilian Technology Park Specialist	\$900	10	\$9,000
	Brazilian Economist	\$900	4	\$3,600
	Brazilian Govt Budget Analyst	\$750	2	\$1,500
	Brazilian Project Analyst	\$750	2	\$1,500
	Project Coordinator	\$1,000	4	\$4,000
Subtotal Task 2			59	\$ 66,700
Task 3				
Conduct A Needs/Requirement Analysis				
	Team Leader	\$1,300	5	\$6,500
	International Technology Park Specialist	\$1,300	15	\$19,500
	International Economist	\$1,300	7	\$9,100
	Environmental Specialist	\$1,100	3	\$3,300
	Brazilian Technology Park Specialist	\$900	10	\$9,000
	Brazilian Economist	\$900	2	\$1,800
	Brazilian Govt Budget Analyst	\$750	2	\$1,500
	Brazilian Project Analyst	\$750	2	\$1,500
	Project Coordinator	\$1,000	3	\$3,000
Subtotal Task 3			49	\$ 55,200
Task 4				
Develop Specs, Architecture, Business Model Etc				
	Team Leader	\$1,300	5	\$6,500
	International Technology Park Specialist	\$1,300	10	\$13,000
	International Economist	\$1,300	2	\$2,600
	Environmental Specialist	\$1,100		\$0
	Brazilian Technology Park Specialist	\$900	7	\$6,300
	Brazilian Economist	\$900	1	\$900
	Brazilian Govt Budget Analyst	\$750	1	\$750
	Brazilian Project Analyst	\$750	2	\$1,500
	Project Coordinator	\$1,000	3	\$3,000
Subtotal Task 4			31	\$ 34,550
Task 5				
Economic And Financial Analysis				
	Team Leader	\$1,300	5	\$6,500
	International Technology Park Specialist	\$1,300	3	\$3,900
	International Economist	\$1,300	8	\$10,400
	Environmental Specialist	\$1,100		\$0
	Brazilian Technology Park Specialist	\$900	1	\$900
	Brazilian Economist	\$900	6	\$5,400
	Brazilian Govt Budget Analyst	\$750	5	\$3,750
	Brazilian Project Analyst	\$750	3	\$2,250
	Project Coordinator	\$1,000	3	\$3,000
Subtotal Task 5			34	\$ 36,100

Task 6				
Organization				
	Team Leader	\$1,300	4	\$5,200
	International Technology Park Specialist	\$1,300	6	\$7,800
	International Economist	\$1,300	2	\$2,600
	Environmental Specialist	\$1,100	2	\$2,200
	Brazilian Technology Park Specialist	\$900	3	\$2,700
	Brazilian Economist	\$900	1	\$900
	Brazilian Govt Budget Analyst	\$750	1	\$750
	Brazilian Project Analyst	\$750	2	\$1,500
	Project Coordinator	\$1,000	4	\$4,000
Subtotal Task 6			25	\$ 27,650
Task 7				
Environmental Assessment				
	Team Leader	\$1,300	2	\$2,600
	International Technology Park Specialist	\$1,300		\$0
	International Economist	\$1,300		\$0
	Environmental Specialist	\$1,100	6	\$6,600
	Brazilian Technology Park Specialist	\$900		\$0
	Brazilian Economist	\$900		\$0
	Brazilian Govt Budget Analyst	\$750		\$0
	Brazilian Project Analyst	\$750		\$0
	Project Coordinator	\$1,000	2	\$2,000
Subtotal Task 7			10	\$ 11,200
Task 8				
Developmental Impact Analysis				
	Team Leader	\$1,300	5	\$6,500
	International Technology Park Specialist	\$1,300	4	\$5,200
	International Economist	\$1,300		\$0
	Environmental Specialist	\$1,100		\$0
	Brazilian Technology Park Specialist	\$900		\$0
	Brazilian Economist	\$900		\$0
	Brazilian Govt Budget Analyst	\$750	1	\$750
	Brazilian Project Analyst	\$750	3	\$2,250
	Project Coordinator	\$1,000	2	\$2,000
Subtotal Task 8			15	\$ 16,700
Task 9				
Project Planning And Implementation				
	Team Leader	\$1,300	6	\$7,800
	International Technology Park Specialist	\$1,300	5	\$6,500
	International Economist	\$1,300	1	\$1,300
	Environmental Specialist	\$1,100	2	\$2,200
	Brazilian Technology Park Specialist	\$900	4	\$3,600
	Brazilian Economist	\$900		\$0
	Brazilian Govt Budget Analyst	\$750	1	\$750
	Brazilian Project Analyst	\$750	3	\$2,250
	Project Coordinator	\$1,000	3	\$3,000
Subtotal Task 9			25	\$ 27,400
Task 10				
Preparation of TOR For Edital				
	Team Leader	\$1,300	10	\$13,000
	International Technology Park Specialist	\$1,300	10	\$13,000
	Brazilian Technology Park Specialist	\$900	6	\$5,400
	Brazilian Govt Budget Analyst	\$750	2	\$1,500
	Brazilian Project Analyst	\$750	4	\$3,000
	Procurement Specialist	\$1,100	5	\$5,500
	Project Coordinator	\$1,000	3	\$3,000
Subtotal Task 10			43	\$ 44,400
Task 11				
Preparation of Procurement Report				
	Team Leader	\$1,300	4	\$5,200
	International Technology Park Specialist	\$1,300	1	\$1,300
	Brazilian Technology Park Specialist	\$900	1	\$900
	Brazilian Govt Budget Analyst	\$750	1	\$750
	Brazilian Project Analyst	\$750	1	\$750
	Procurement Specialist	\$1,100	5	\$5,500
	Project Coordinator	\$1,000	3	\$3,000
Subtotal Task 11			17	\$ 19,200

Task 12			
Present. & Final Report	Team Leader	\$1,300	15 \$ 19,500
	International Technology Park Specialist	\$1,300	8 \$ 10,400
	Environmental Specialist	\$1,100	2 \$ 2,200
	Brazilian Technology Park Specialist	\$900	4 \$ 3,600
	Brazilian Govt Budget Analyst	\$750	1 \$ 750
	Brazilian Project Analyst	\$750	2 \$ 1,500
	Procurement Specialist	\$ 1,100	4 \$ 4,400
	Project Coordinator	\$1,000	8 \$ 8,000
Subtotal Task 12			21 \$ 48,150
Total Direct Labor	Team Leader	\$1,300	75 \$ 97,500
	International Technology Park Specialist	\$1,300	86 \$ 111,800
	International Economist	\$1,300	28 \$ 36,400
	Environmental Specialist	\$1,100	22 \$ 24,200
	Brazilian Technology Park Specialist	\$900	49 \$ 44,100
	Brazilian Economist	\$900	26 \$ 23,400
	Brazilian Govt Budget Analyst	\$750	18 \$ 13,500
	Brazilian Project Analyst	\$750	25 \$ 18,750
	Procurement Specialist	\$ 1,100	14 \$ 15,400
	Project Coordinator	\$1,000	42 \$ 42,000
			385 \$ 427,050
TOTAL DIRECT LABOR			\$ 427,050

ANNEX III: CONTACTS

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