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**A Virtual Technological Park,
an innovation towards the Federal Institute Identity**
(<https://tinyurl.com/VirtualTechPark>)

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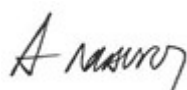
Declaration

Affidavit

I, Antonio Mauro Barbosa de Oliveira, born on the September 20, 1954, in Fortaleza (Ce)/Brazil, hereby declare:

1. that I have independently written my Project Study Paper. I have neither made use of any other sources, tools and resources as those given nor have I used any other unauthorized,
2. that I have neither at home nor abroad presented my Project Study Paper in any other form as examination paper,
3. that I have informed my employer and obtained his understanding concerning the title, form and content of this Project Study Paper.

June 15 th, 2018



Antonio Mauro Barbosa de Oliveira

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1. Introduction

The Federal Institute (FI) has about six hundred units spread out in the country. Most of these units are in small cities, where the local market is sometimes inappropriate regarding to the formation given by the Institute. In general, many graduate students have two unsatisfactory options in these small cities: accept a local inappropriate job (not related with their formation) or go away to a big city. Unfortunately, this reality threatens the FI mission because small cities lose the potential young people able to transform the local society.

To mitigate this problem, one among several solutions is to create appropriate jobs for these young people. This is an important challenge to be considered by the FI National Network. In parallel, another problem with most of young Brazilian people is to have a public job as a priority for professional future, although the market is calling for entrepreneurship. However, to develop their own business is sometimes outside of their professional plans. It is a cultural problem, since the young people that comes to the FI, in general, have a lack of initiative and capability to solve problems.

All things considered, we propose the Virtual Technological Park in order to mitigate negative results caused by the mentioned problems. It concerns a new concept of Park without a physical space, different of the traditional ones. In this new concept, FI labs are used for all activities. Actually, the IFCE- Campus Aracati has already an experience that can be considered a case study for the Virtual Technological Park proposed here. This experience, named Aracati Digital (www.aracatidigital.com.br), began four years ago and it is linked strongly with two supporting actions: LAR¹ lab and EMBRAPII².

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- ¹ LAR is a lab at the IFCE-Campus Aracati, Ceará State (Br), since 2014. It gives the technological and scientific support to the Virtual Technological Park, the project has been presented here. Nowadays, the LAR time has 3 PhD researchers, 5 PhD students, 10 MSc teachers and about 70 scholarship students from the Computer Science Bachelor.
 - ² EMBRAPII is a Social Organization connected to the Brazilian Government. Its operating model enables quickness, flexibility and reduced risk in supporting companies' RD&I projects. The non-refundable grants managed by EMBRAPII are invested in projects carried out by companies and research institutions, acknowledged for their excellence, technological focus and the ability to meet companies' RD&I demands.

2. Justification

We believe it is a FI mission to help the students for their professional career in terms of creativity, initiative, management knowledge and other activities needed to become them entrepreneur even though is not in their plans. Therefore, creativity, initiative and management knowledge are important skills for any kind of professional activities. In fact, there are two approaches in this Virtual Technological Park strategy (VIRTUAL TECHNOLOGICAL PARK, 2017):

- Pedagogical approach: creativity, initiative and management knowledge are very important for graduate students independently if they decide to become the owner of their business, a public or private employee.
- Citizen approach: the knowledge about the set up and management of a company can help the students to become a conscious citizen and to collaborate much better to the society.

The FI must open the students' mind for the perception of this understanding and motivate them to become an entrepreneur, independently of their professional choice. The process of the production and sales of products and services is not easy and evident for the students. However, this understanding is indispensable for the company survival. This kind of subject about business management hasn't been developed properly in pedagogical programs by the FI teachers.

These pedagogical and citizen approaches concern the educational fundamentals from "Escola Pra Valer" book (OLIVEIRA, 2016), inspiration source to the Virtual Technological Park proposed here.

The results already presented by the initial experiences from the Aracati Digital Project (ARACATI, 2018) in progress on the IFCE Aracati Campus are positives towards the Virtual Technological Park objectives and they help to prove that the FI Mission could be achieved in this way.

We truly expect the IMP methodology will improve this Virtual Technological Park proposal in order to create more local opportunities for the former student for his professional career and formation of a new Brazilian citizen through commitment, innovation and a change in attitude.

3. Objetivos

3.1 General

Create a methodology to implement and manage a Virtual Technological Park, a proposal based on an experience taken by the IFCE Aracati campus (ARACATI, 2018). The main purpose of this project is to be adopted by the Federal Institute network as a part of its brand identity, in order to mitigate the problem caused by the migration of the former students from the small cities that doesn't offer adequate job opportunities for them.

For that, we expect to be supported by the local, national and international private companies and public programs as EMBRAPPII, SEBRAE, Governmental Sponsored Agencies (FINEP, CNPq, FUNCAP, etc.).

3.2 Specific

- 1) Elaborate a study about the Aracati Digital experience (ARACATI, 2018) in terms of its social and economic impacts and other technological parks available in the country and abroad, their successes and fails.
- 2) Define a Virtual Technological Park proposal as a new concept and highlighting the advantages and disadvantages issues comparing it to the traditional Parks based on physical spaces.
- 3) Prepare a Strategical Plan based on the innovation management concepts, using IMP framework (STEINBEIS BERLIN UNIVERSITY, 2018).
- 4) Describe a new methodology composed by the steps able to develop and manage a Virtual Technological Park.
- 5) Elaborate a business model to involve the FI community (students, administrative and teachers) and the entrepreneurs about the importance of the Virtual Technological Park to the FI mission and the socioeconomic advantages for the local society.
- 6) Prepare an installation and operation Guide of the Virtual Technological Park based on the IMP innovation framework (DOSTLER, 2016).

4. Identification Problem

In order to fill the Project Plan (item 5), This work has used two strategies. The first one is a pool form set involving teachers and students from IFCE. Their perception about the problem treated by the Virtual Technological Park is very important for the real problem identification. The second strategy take advantage the tools available on the Innovation Management Professional (IMP) course from the Steinbeis Berlin University (STEINBEIS BERLIN UNIVERSITY, 2018), supported by SETEC/MEC initiative (BRASIL, 2017): Pest Analyses, BCG Matrix (Boston Consulting Group) and SWOT Analysis.

4.1 Pest Analyses

(The Project Pest Analyses can be found in the Project's draft)

4.2 BCG Matrix (Boston Consulting Group)

(The Project BCG Matrix can be found in the Project's draft)

4.3 SWOT Analysis

4.3.1 Strength about the Virtual Technological Park Project

- Believe the school is truly a space for the transformation of the society through the good education, awakening their students to become the actors of this transformation.
- The commitment with the FI mission as a real mechanism able to give the opportunities for the students, preparing them to face the society challenges.
- Consider the tradition of the FI network into the solution of the real society problems, due its different trajectory from the formation of the basic professional to the high-level research in all the areas.
- Assume FI network has a mystic identity able to influence the future of each student and, as consequence, the nation.
- The need to have strategies able to motivate the former students to stay in their cities, helping to mitigate their social, cultural, technological and economic problems.
- The FI network has a recognized group of teachers, administrative people and researchers able to perform a high quality of products and services for the market.

4.3.2 Weakness about the Virtual Technological Park Project

- Some teachers and administrative employees don't understand the FI identity, its mission, and its capability to change the society. When the new employees are hired they are influenced by this behavior.
- In general, the FI campus doesn't have an efficient marketing strategy able to be known by the society and collaborate with it in many. This situation interferes in the close relationship with the market and, consequently, difficult to catch projects to keep the Virtual Technological Park.

4.3.3 Opportunities about the Project

- In terms of technological formation, the FI network is known as an institution of excellence. So, the market is more accessible to our professionals.
- In terms of education, the FI network has (still) a good reputation in the society, in the market and the public and private institutions. This image makes easier the participation of our students in management position.
- The government mentality about innovation is fundamental to keep strategies to grow the development and research involving students towards entrepreneurship and start-up concepts.
- The existence of programs like EMBRAP II are fundamental for the incentive of the creation of the mechanisms like the Virtual Technological Park.

4.3.4 Threatening about the Project

- Unstable economy seems to be the first issue that can threaten the creation and maintenance of a Virtual Technological Park.
- A conservative policy in terms of Federal Innovation Law that denies the recent progress achieved, making it harder the relationship between the FI and the private companies.
- The current model of internal elections for rector and general director that sometimes uses the bad procedures used in the regular political elections not recommended for a school. Sometimes, groups that support a candidate receive privileges from the winner.

5 Project Plan

5.1 Project Scope Management (Project Map)

The scope of the project considers the focus, the target, the objectives of the project and the goals that need to be met to achieve a good result. There are some steps that can be followed when doing this.

5.1.1 Final Product of the Project

A methodology to implement and manage a Virtual Technological Park, a proposal based on an experience taken by the IFCE Aracati campus. The main purpose of this project is to be adopted by the Federal Institute network as a part of its brand identity, in order to mitigate the problem caused by the migration of the former students from the small cities that doesn't offer adequate job opportunities for them. In order to create this methodology it needs:

- FP 1: Definition of the Virtual Technological Park model
- FP 2: Methodology to create a Virtual Technological Park
- FP 3: Implementation of the Virtual Technological Park Methodology
- FP 4: Set of strategies to maintain of the Virtual Technological Park
- FP 5: Adoption of the Virtual Technological Park as a FI identity concept

Requirements

- R1: A favorable local culture oriented to the innovation management
- R2: Support to the project from the FI Direction and the IF leaders
- R3: Economic innovation policies as the EMBRAPPII program

Stakeholders

- S1: Teachers and coordinators of all FI areas.
- S2: FI Administration staff
- S3: Students and former students
- R4: Local Management

5.1.2 Work breakdown structure (WBS) and Detailed Actions

FP 1: Definition of the Virtual Technological Park

- D1.1: Report about the educational, social and economic impacts of the Aracati Digital experience, since 2014.

- D1.2: Report detailing the technical aspects of the Aracati Digital Park implementation at the IFCE,
- D1.3: Report describing the main Brazilian Technological Park and the International Technological Parks.
- D1.4: Report about the Virtual Technological Park concept, highlighting the difference to a conventional Technological Park concept and the advantages and disadvantages issues comparing it to the traditional Parks based on physical spaces.

FP 2: Creation of the Virtual Technological Park Methodology

- D2.1: Report about the methodologies used to create the main Brazilian and the International Technological Parks.
- D2.2: Design of interactive website mockups of the Project
- D2.3: Business model to involve the FI community (students, administrative and teachers), entrepreneurs and stakeholders.
- D2.4: Methodology of the Project in the IF network context.

FP 3: Implementation of the Virtual Technological Park Prototype

- D3.1: Strategical Plan to implement the Virtual Technological Park based on the innovation management concepts (IMP framework)
- D3.2: Information architecture to support the Virtual Technological Park Methodology based on the website mockup designs.
- D3.3: Frontend interface for the Virtual Technological Park APP.
- D3.4: Backend to support the related frontend interface.
- D3.5: Virtual Technological Park Prototype in the IF context.

FP 4: Maintenance of the Virtual Technological Park

- D4.1: Report about the importance of the Virtual Technological Park to the FI mission and the socioeconomic advantages for the local society.
- D4.2: Installation and operation Guide of the Virtual Technological Park based on the IMP innovation framework.
- D4.3: Strategies to propose the Virtual Technological Park Model as a concept of the FI identity.

5.2 Chronogram

	TITULO	INÍCIO	FIM	DUR
1	✍ <input type="checkbox"/> Parque Tecnológico como estratégia de inov	02/02/2018	06/03/2019	284
2	✍ <input type="checkbox"/> Definition of a Virtual Technological Park	02/02/2018	29/08/2018	149
3	✍ <input type="checkbox"/> Report about the educational, social and c	02/02/2018	04/06/2018	87
4	✍ Network Federal Institute Mission	03/05/2018	18/05/2018	12
5	✍ Virtual Technological Park Approaches	03/05/2018	18/05/2018	12
6	✍ <input type="checkbox"/> Report detailing the technical aspects of t	05/03/2018	03/07/2018	87
7	✍ PEST Analysis - Problem Identification	21/05/2018	01/06/2018	10
8	✍ BCG Matrix - Problem Identification	21/05/2018	01/06/2018	10
9	✍ SWOT Analysis - Problem Identification	21/05/2018	01/06/2018	10
10	✍ <input type="checkbox"/> Report describing the main Brazilian Tech	02/04/2018	29/08/2018	108
11	✍ Em andamento	16/07/2018	10/08/2018	20
12	✍ <input type="checkbox"/> Report about the Virtual Technological Pa	02/02/2018	11/07/2018	114
13	✍ Em andamento	02/02/2018	01/03/2018	20
14	✍ <input type="checkbox"/> Creation of the Virtual Technological Park M	02/05/2018	04/09/2018	90
15	✍ Report about the methodologies used to c	02/05/2018	04/06/2018	24
16	✍ Design of interactive website mockups of	04/06/2018	04/09/2018	67
17	✍ Business model to involve the FI commur	02/05/2018	03/07/2018	45
18	✍ Methodology of the Virtual Technological	03/07/2018	04/09/2018	46
19	✍ <input type="checkbox"/> Implementation of the Virtual Technological	02/08/2018	06/03/2019	155
20	✍ Strategical Plan to implement the Virtual	02/08/2018	04/09/2018	24
21	✍ Information Technology architecture to su	02/08/2018	04/09/2018	24
22	✍ Frontend interfaces (IT System) for the Vi	02/08/2018	02/10/2018	44
23	✍ Backend (IT System) to support the relate	02/10/2018	01/01/2019	66
24	✍ Prototype of the Virtual Technological Par	04/12/2018	04/02/2019	45
25	✍ <input type="checkbox"/> Maintenance of the Virtual Technological P	02/02/2018	06/03/2019	284
26	✍ Paper about the Virtual Technological Par	02/02/2018	03/09/2018	152
27	✍ Installation and operation Guide of the Vir	02/07/2018	06/03/2019	178
28	✍ Strategies to propose the Virtual Technok	02/07/2018	06/03/2019	178

5.3 Global Costs: R\$ 12.518,87

Project's Economic Counterpart is just Human Resources.

5.4 Risks, Premises and Restrictions

5.4.1 Risks

The following are listed three risks that threaten the Virtual technological Park project, proposed here:

- a) PRIVATE PROJECTS: The main risk to implement The Virtual Technological Park is probably the lack of projects coming from private companies. These projects provide the financial support to maintain the appropriated jobs to the former students in the initial period of their professional life.
- b) UNDERSTANDING: The rejection of the Virtual Technological Park idea by the local IF community due the lack of information about the project proposal and the innovation management concept. Unfortunately, this kind of proposal the innovation concept are outside of the current cultural in the Federal Institutes.
- c) ECONOMY: The weakness of the national economic system that may affect the ordinary activities of the IF, as the administrative internal works (cleaning, security, material maintenance, electricity, etc.).

5.4.2 Premises

The following are listed two premises about the Virtual Technological Park:

- a) INNOVATION POLICY: The adoption of the innovation concept as a general direction for education policy in the Federal Institute. For that the rector and his staff must to consider the research and development as important activities as the education action. Unfortunately, it isn't the reality in many Federal Institute units that consider research activities more concerning with the university.
- b) CULTURAL ORGANIZATION: While the adoption FI INNOVATION POLICY is a premise concerning the FI staff, the CULTURAL ORGANIZATION is related to the each FI unit. Actually, the FI units are different spaces in terms of cultural organization that depend on the many abstract aspects able to promote changes.

5.4.3 Restrictions

The following are listed three concerned restrictions about the Virtual Technological Park project:

- a) **TECHNICAL INFRASTRUCTURE:** The term “virtual” in the title of the proposal is an import feature of the project because dismiss the big investment in buildings, as happen in the conventional Technological Park concept. However, in order to implement the proposed here it is indispensable to have adequate labs.
- b) The availability of the research professors and collaborators teachers to coordinate and manage the projects is indispensable to execute the main activities of the Virtual Technological park. Sometimes these professors and are very charged in education activities and there isn't time to dedicate to the projects.
- c) Besides the restrictions above, without the scholarship students is also impossible to archive the objective of the proposed here. After all, the professional formation of these students and their experience in real scenarios provided by the projects come from the private companies is the main strategy proposed by the Virtual Technological Park.

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