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A Virtual Technological Park,

an innovation towards the Federal Institute Identity

FASE D1: Definition of the Virtual Technological Park

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

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SUMARY

ABSTRACT

Nowadays, we have observed the positive expansion of several Federal Institutes of Technology (FI) campuses in small cities. However, most of these small cities are not prepared to offer facilities to absorb formed students, such as a job opportunity or facility to open their own business. As a consequence, these professionals end up accepting jobs that are not related with their formations or migrating to developed centers, where job offers in their areas are most attractive. In the latter case, we identify a paradox in relation to the IF mission once this institution tries to be a social transformation agent of the region, since these small cities lose the main subject of this transformation, the young people. Our proposal linked to the creation of Virtual Technological Park becomes an important component of FIs identity, which could be a safe mechanism to mitigate the negative results caused by these mentioned problems, as well as can increase the efficiency of the FIs. This is the first delivery of the FASE 01 of the project. It presents a Report about the educational, social and economic impacts of the Aracati Digital experience, since 2014, in the Federal Institute of Ceará, Aracati Campus.

Keywords: Technological Park, Innovation Management, Aracati Digital

1. Introduction

1.1 Network Federal Institute Mission

The network of the Federal Institute (FI) has about six hundred units spread out in the country. The most of these units are in the small cities where the local market is sometimes inappropriate regarding to the formation given by the Institute. Consequently, these professionals end up accepting jobs that are not related with their formations or migrating to developed centers, where job offers in their areas are most attractive.

Unfortunately, this reality threatens the FI mission. When it happens, the small cities lose their potential young people able to transform the local society. To mitigate this problem, one of the solutions is to create appropriate jobs for these young people. This is an important challenge to be considered by the FI national network.

In the context of the FI Identity, another problem with most of young people is to have a public job as a priority for their professional future, although the market is tending for entrepreneurship. To have their own business is sometimes outside of students' professional plans. Maybe it's a cultural problem. In general, the young people that come to the FI have a lack of initiative and capability to

solve problems.

To try to solve these two problems above we propose the Virtual Technological Park, a new concept without a physical space, different of the traditional ones. In this new concept, the 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: LAR lab and EMBRAPII.

1.2 About LAR - Computer Network and System Laboratory

The LAR is the first research and development computer lab of Ceará State, Brasil. It was founded in 1987 at the Federal Technical School of Ceará, called today Federal Institute of Ceará. At this time the LAR had the technical support of the Telemedia Lab from Pontifical Catholic University of Rio de Janeiro, created by Prof Luiz Fernando Gomes Soares (SOARES, 2018). He was the inventor of the Nested context language (NCL) and Ginga-NCL[1] for IPTV services, a declarative glue language that holds media object presentations synchronized in time and space.

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 of the IFCE-Campus Aracati. The PhD professors are also participants of the Post Graduate Computer Science Program at the IFCE. These 70 LAR students have scholarships supported from the R&D Brazilian Governmental Agencies (FINEP, CNPq, CAPES, FUNCAP) or from private companies encouraged by EMBRAPII, the Brazilian Agency for Industrial Research and Innovation that has had an important role (EMBRAPII, 2018) to the Virtual Technological Park concept..

1.3 About the EMBRAPII

EMBRAPII is a Social Organization connected to the Ministry of Science, Technology, Innovations and Communications (MCTIC) and to the Ministry of Education (MEC). Its operating model enables quickness, flexibility and reduced risk in supporting companies' RD&I projects.

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[1] The Ginga-NCL becomes the Recommendation H.761 of the ITU-T, a specialized agency of the United Nations

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.

EMBRAPII Units have funds that are available exclusively for innovation projects. It operates through cooperation with public or private technological and scientific research institutions, that are accredited as EMBRAPII Research Units. These Units focus on entrepreneurial demands and innovation projects that are in the pre-competitive stage.

How EMBRAPII works:

The R&D Institution submits proposals to the Public Call (link) accreditation, open periodically by EMBRAPII. Once accredited, through a Plan of Action, the EMBRAPII Units (link) and EMBRAPII Hubs (link) are able to develop RD&I projects with industrial companies.

Advantages for R&D Institutions:

- Investment is shared – EMBRAPII model affords lower risk and costs to innovation projects;
- Agility: a portion of financial resources is released immediately;
- Partnership with companies that commercialize products developed jointly with RD&I Institution;
- Professional qualification of RD&I management, supported by the EMBRAPII Operational Excellence System.

How financial resources are released:

- EMBRAPII anticipates resources for Unit hire projects with companies >resources for costs.
- Project is negotiated directly between the COMPANY and Accredited Unit.
- Enables agility, flexibility and speed in the use of resources and changing scope of projects.

1.4 IFCE EMBRAPII

The Federal Institute of Ceará (IFCE) has many laboratories specialized in computer networks, embedded and intelligent systems, and telecommunications and software engineering:

- LIT – Laboratório de Inovação Tecnológica, Sistemas Embarcados para energia;
- LDS – Laboratório de Desenvolvimento de Software;
- LAPADA – Laboratório de Pesquisa Aplicada e Automação;
- NASH – Laboratório do Núcleo Avançado em Engenharia de Software Distribuído
- FOTÔNICA – Laboratório de Fotônica;
- SISCOME – Laboratório de Controle e Medição de Energia;
- LAMP – Laboratório de Aplicações Maciçamente Paralelas;
- LAR – Laboratório de Redes;
- LIVIA – Laboratório de Inteligência, Visão e Automação;
- LARS – Laboratório de Automação, Redes e Sinais;
- GDESTE – Laboratório do Grupo de Desenvolvimento em Telecomunicações

The first IFCE industrial innovation project was carried out in partnership with COELCE in 2002. Since then, IFCE has increased the number of research projects carried out in partnership with companies, and over the past four years more than 100 projects have been developed with 73 firms from various sectors of the economy.

The experience accumulated by IFCE in recent years enabled a set of actions that that resulted in its accreditation, through public call EMBRAPII 02/2014, as EMBRAPII Hub Fortaleza. It is accredited in the technological competencies associated with Embedded and Digital Mobility Systems. These skills enable industrial companies to develop innovative product design and processes.

2 Justification

2.1 Virtual Technological Park Approaches

We believe it's a FI mission to help the students for their professional career in terms of creativity, initiative, management knowledge and other activities needed to make them entrepreneurs even though isn't 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.

Finally, 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.

2.2 Some LAR Results

We can consider two classes of results from the LAR experience: RD&I and Education results:

Table 1 – RD&I and Education Results

Achieved Result	Discussions
RD&I Results	Since 2014, the LAR Lab has performed many research projects from the governmental agencies, in special from the CNPq. The LAR Lab average is about 10 projects per year, involving 40 scholarship students.
• Scholarship student projects.	The most of these projects has served to guide the student TCC projects (Work of Course Conclusion) or as a solution for help the non-profit public or private institutions. We can highlight the following projects: • SISAPP to Peter Pan Hospital, supported by CNPq and Peter Pan Association • NextSaude to Aracati City, supported by FUNCAP These projects above and the other projects supported by the Government Agencies correspond the financial and economic investments around R$2.000.000,00
• Energy Agency Projects	The second step on the LAR trajectory was the project demanded by ANEEL, the Brazilian Energy Agency, in collaboration with the IFCE-Fortaleza researchers. Financial and economic investments around R$1.000.000,00
• EMBRAPII Projects	After EMPRAPII-IFCE Polo was inaugurated, the LAR lab started his collaboration with the private companies. Financial and economic investments around R$5.000.000,00.
• Other projects	The LAR Lab has collaborated with many other institutions in order to find the innovation solutions for them: • Atlantico Institute: GISSA Project, supported by FINEP

	• Avicena Software and Services: GISSA Urgency and Emergency, supported by FUNCAP Nowadays, the LAR Lab has two researchers with FUNCAP Productivity Scholarships that involves 10 students and almost R$300.000,00 for computer material, participation in scientific events and scholarship students.
Education Results	Likewise, the RD&I Results, the Education Results play an important role in the Virtual Technological Park proposal. However, this kind of results are, naturally, more abstract than the RD&I Results presented before. We consider here the pedagogical and social aspect provided by the LAR lab environment. It is very common we hear all the time that there are two kinds of students in the IFCE-Aracati Computer Science Course: the regular students and the LAR scholarship students. In the LAR Lab the students are involved on an intangible atmosphere, a fantastic pedagogical mix between the academic scenario and the market real scenario. These scenarios correspond respectively the academic projects and the projects related with the private companies encouraged by the EMBRAPII as mentioned before. Anyway, this pedagogical mix experience is very rich in terms of the entrepreneurship skill. It is a very important concept for the Virtual Technological Park and is not easy to find it in regular classes.