

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

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*“O aluno nos percebe mais pelo que fazemos
do que pelo que dizemos”*

*“E quando nosso aluno for tentado a mentir,
a humilhar ou a ser injusto
que ele honre sua Escola que o preparou ...
"dono de seu destino, capitão de sua alma"!*

*“Uma Escola que é o reflexo da sociedade
não serve a ela... nem pra ela”*

(in ESCOLA pra VALER)

TITLE: Virtual Technological Park, an innovation towards the Federal Institute Identity

RESUMO

Vários campi da Rede de Institutos Federais (IF) estão localizados em pequenas cidades que, em geral, não oferecem ao recém formado dos IFs oportunidade de emprego ou facilidade para abertura de seu próprio negócio. Em consequência, estes egressos acabam aceitando trabalhos inapropriados com a sua formação ou migram para centros mais desenvolvidos de maior empregabilidade. Neste último caso, acontece um paradoxo em relação a missão do IF enquanto agente de transformação social da região, a medida que o município perde seus jovens com grande potencial para esta engendrar esta transformação. A proposta da criação de um Parque Tecnológico Virtual nos IF como componente de sua identidade, pode ser um mecanismo seguro para mitigar este problema que põe em xeque a eficiência da missão do IF. Este trabalho apresenta os resultados já alcançados com o Aracati Digital, uma experiência neste contexto levada a efeito no IFCE campus Aracati (Ce), além de uma metodologia baseada em um framework de Gestão da Inovação (PEST, BCG e SWOT) proposta pelo Innovation Management Professional, um curso da Steinbeis Berlin University, promovido pela Secretaria de Ensino Profissional (SETEC) do MEC.

Palavras-chave: Parque Tecnológico, Inovação, Empreendedorismo, Planejamento Estratégico.

1. INTRODUCTION:

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. So, in general, many graduate students have two bad options in these small cities: take a local inappropriate job or go away to a big city.

Unfortunately, this reality threatens the FI mission because when it happens the small cities lose their potential young people able to transform the local society. To mitigate this problem, one among 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 this context, another problem with most of young people is to have a public job as a priority for their professional future, although the market is calling for entrepreneurship. To have their own business is sometimes outside of their professional plans. Maybe it's a cultural problem. In general, the young people that comes 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 of Park without a physical space, different of the traditional ones. In this new concept, the FI labs are used for all activities.

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 become them entrepreneur 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, and this understanding is indispensable for the company survival. This kind of subject about management knowledge 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 proposal was born.

2. OBJECTIVES

2.1 General objective

Create a methodology to develop and manage a Virtual Technological Park based on the Aracati Digital (ARACATI, 2018), an experience taken by the IFCE, Aracati campus (IFCE-Aracati, 2018). The main issue of this proposal is to use this methodology as an innovation pilot project for a new pedagogical initiative to be adopted by the FI network. For that, we expect to be supported by the private local, national and international companies and public programs as EMBRAPII, SEBRAE, Governmental Sponsored Agencies (FINEP, CNPq, FUNCAP, etc.).

2.2 Specific objectives

- 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 as a new concept, and highlighting the advantages and disadvantages comparing it to the traditional Parks based on physical spaces.
- 3) Prepare a Strategical Plan based on the innovation management concepts, using IMP framework.
- 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).

3. EXECUTION PLAN

In order to achieve the objectives above, we propose:

- 1) Visit the following case studies:
 - Porto Digital (<http://www.portodigital.org>),
 - São José dos Campos (<http://www.pqtec.org.br/>),
 - Sapiens Parque de Florianópolis (<http://www.sapiensparque.com.br/>);
- 2) Perform the partnership with the sponsors mentioned in General Objective: EMBRAPPII, SEBRAE, Governmental Sponsored Agencies (FINEP, CNPq, FUNCAP, etc.).
- 3) Install new cell productions based on the lab models that work properly in the Aracati Digital experience.
- 4) Training new cell productions using the installation and operation Guide of the Virtual Technological Park based on the IMP innovation framework.
- 5) Make a marketing plan for the consolidation of the Virtual Technological Park.

4. STRATEGICAL PLANNING

The strategic planning presented here is based on the Innovation Management Professional (IMP) course from the Steinbeis Berlin University (STEINBEIS BERLIN UNIVERSITY, 2018), supported by SETEC/MEC initiative (BRASIL, 2017).

4.1 PEST Analysis

PEST Analysis is a simple and widely used tool that helps you analyze the Political, Economic, Socio-Cultural, and Technological changes in your business environment. This helps you understand the "big picture" forces of change that you're exposed to, and, from this, take advantage of the opportunities that they present (MINDTOOL, 2018).

4.1.1 Political Aspects about the Virtual Technological Park Project

- **New Elections in the country:**

CURRENT SITUATION: In Brazil when we have national or regional elections and change of political parties running the country many governmental programs don't continue. For instance, the Virtual Technological Park project depends on the programs involving strong relationship between FIs and the private companies, as proposed by the EMBRAPPII strategy. Unfortunately, this is still a cultural behavior in Brazil that we consider as a challenge for the education system to be changed.

TENDENCY: Nowadays, the new vision and perception about the innovation concept is spread out in all private and even more in public companies worldwide. So, it is easier to conclude innovation concept that support the relationship with the market has a big chance to remain, independently of the political ideology running the country.

- **Lack of an integrated internal policy of innovation**

CURRENT SITUATION: Supposing the FI Superior Council decides to approve an innovation policy to improve the integration of the Institution with the society. For that, this council, through the FI main board, proposes to apply this policy in all FI units. Nowadays, each unit is a little bit independent to adopt or not the policies that are out of the FI regular education statute, because each general director is elected by the local community. If this is good to the FI democracy practical, on the other hand is more difficult to introduce the innovations in the Institute.

TENDENCY: We believe the adoption of an integrated internal policy of innovation is a fact in all units of the FI network, independent of the political vision of the general director because the unit that does not adopt the innovation tendency take a risk to fail in terms of the local administration. There are many opportunities that a unit can miss if it keeps isolated of the society and its market.

4.1.2 Market Aspects about the Virtual Technological Park Project:

CURRENT SITUATION: The health of the Brazilian economic situation has been very unstable in the past years. One of the consequences of this instability is the fragility of the market for attracting international investments. The result is a low growth rate of our economy. The Virtual Technological Park is a project oriented. So, it depends on the current economy.

TENDENCY: Recently, the Brazilian economy has given signs of growth. We expect the Brazilian economy may recover its growth rate because we recognize a better maturity of the society, mechanisms of the political control despite the inefficiency of current political class.

4.1.3 Social Aspects about the Virtual Technological Park Project

CURRENT SITUATION: The most of the FI students come from poor families, especially in the small towns far from the capital. Sometimes, these students leave the course before ending it. Their socioeconomic situation makes them to find a job in order to help their family. Associated to this financial problem, there is another higher problem: the drugs have increased in all the Brazilian cities.

TENDENCY: Unfortunately, different of the economic situation, the social problem has gone up. The Brazilian education model has failed in both problems: to keep the students at school, as it happens in the developed countries, and about the drugs spread out among young people.

4.1.4 Technological Aspects about the Virtual Technological Park Project

CURRENT SITUATION: The Information Technology seems to be the one that more affect the youth daily routine. The new generation born in this century is distinguished by the excessive use of smartphone associated to its social medias.

TENDENCY: The studies performed by the social and education researches point out to the influence of the information technology tools in young people lives, added with artificial intelligence structures.

4.1.5 Environmental Aspects about the Virtual Technological Park Project

CURRENT SITUATION: Nothing special to remark, except the common proceedings attached the conscious to treat properly the nature: garbage, selected garbage, recycling, energy economy, etc.

TENDENCY: The conscious awareness campaigns are more often at schools, on the news and by the government institutions.

4.1.6 Legal Aspects about the Virtual Technological Park Project

CURRENT SITUATION: As the Virtual Technological Park is oriented by projects involving FI and the private companies, it strongly depends on the legal aspects for this relationship.

TENDENCY: The good results got with the first experience inside the FI labs with EMBRAPII strategies seem to be enough to guarantee the continuation of the relationship between FI and the market.

4.2 BCG Matrix (Boston Consulting Group)

The BCG matrix assesses products on two dimensions. The first dimension looks at the products general level of growth within its market. The second dimension then measures the product's market share relative to the largest competitor in the industry. Analyzing products in this way provides a useful insight into the likely opportunities and problems with a particular product. Products are classified into four distinct groups, Stars, Cash Cows, Problem Child and Dog (PROFESSIONAL ACADEMY, 2018).

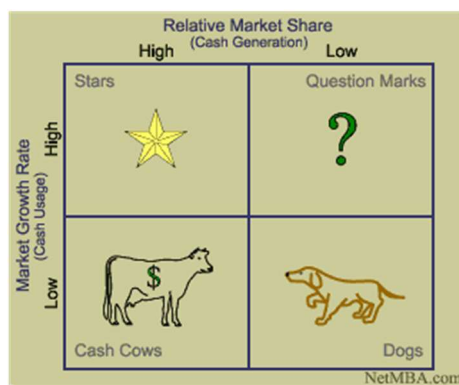


Figure 01: BCG Matrix

Lets have a look at what each one for Virtual Technological Park decision-making process.

4.2.1 STAR: HIGH market growth rate and HIGH market share

- Development of web solutions (front end and back end) in all modern platforms for the international and national market

- The help of the governmental programs to initial support of the Virtual Technological Park

4.2.2 **Question Marks:** HIGH market growth rate and LOW market share

- Development of web solutions (front end and back end) in all modern platforms for local market

4.2.3 **CASH COW:** LOW market growth rate and HIGH market share

- Development of solutions involving modern technologies (Artificial Intelligence, Internet of Things - IoT, Big Data, Web Semantic) for the international and national market

4.2.4 **DOG:** LOW sales growth rate and LOW market participation

- The internal fake image built by the colleagues about the target and the results of the Virtual Technological Park.
- The prejudice of the market about the technical competence of the labs in the FI in the small cities located in the underdeveloped states.

4.3 SWOT Analysis

It is a strategic planning technique used to help a person or organization identify the Strengths, Weaknesses, Opportunities, and Threats related to business competition or project planning. It is intended to specify the objectives of the business venture or project and identify the internal and external factors that are favorable and unfavorable to achieving those objectives.

| | Opportunities (external, positive) | Threats (external, negative) |
|---|---|---|
| Strengths (internal, positive) | <p>Strength-Opportunity strategies</p> <p>Which of the company's strengths can be used to maximize the opportunities you identified?</p> | <p>Strength-Threats strategies</p> <p>How can you use the company's strengths to minimize the threats you identified?</p> |
| Weaknesses (internal, negative) | <p>Weakness-Opportunity strategies</p> <p>What action(s) can you take to minimize the company's weaknesses using the opportunities you identified?</p> | <p>Weakness-Threats strategies</p> <p>How can you minimize the company's weaknesses to avoid the threats you identified?</p> |

Figure 02: SWOT Matrix

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 Virtual Technological Park 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 EMBRAPPII are fundamental for the incentive of the creation of the mechanisms like the Virtual Technological Park.

4.3.4 Threatening about the Virtual Technological Park 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. IFCE-ARACATI CASE STUDY

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.

5.1 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), inventor of the Nested context language (NCL) and Ginga-NCL¹ 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 presented here. Nowadays, the LAR time has e PhD, 5 PhD students, 10 MSc and about 70 scholarship students from the Computer Science Bachelor of the IFCE-Campus Aracati. Their 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. In this context, the EMBRAPII, the Brazilian Agency for Industrial Research and Innovation, has been an important role (EMBRAPII, 2018).

5.2. 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.

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 EMBRAP II 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.

EMBRAP II 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 EMBRAP II Research Units. These Units focus on entrepreneurial demands and innovation projects that are in the pre-competitive stage.

5.2.1. How EMBRAP II works:

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

5.2.2 Advantages for R&D Institutions:

- Investment is shared – EMBRAP II 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 R&D Institution.
- Professional qualification of R&D management, supported by the EMBRAP II Operational Excellence System.

5.2.3. How financial resources are released:

- EMBRAP II 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.

5.2.4. EMBRAP II IFCE

The Federal Institute of Ceará (IFCE) has many laboratories that are 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 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.

6. SOME RESULTS

We can consider two classes of results from the LAR experience: R&D and Education results:

Table 1 – R&D and Education Results

| Achieved Result | Discussions |
|---|--|
| R&D Results | Since 2014, the LAR Lab has been performed many research projects from the governmental agencies, in special from the CNPq. The overage of the LAR Lab per year is about 10 projects, involving 40 scholarship students. |
| <ul style="list-style-type: none"> • Scholarship student projects. | <p>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:</p> <ul style="list-style-type: none"> • SISAPP to Peter Pan Hospital, supported by CNPq and Peter Pan Association • NextSaude to Aracati City, supported by FUNCAP <p>These projects above and the other project supported by the Government Agencies correspond the financial and economic investments around R\$2.000.000,00</p> |
| <ul style="list-style-type: none"> • Energy Agency Projects | <p>The second step on the LAR trajectory was the project demanded by ANEEL, the Brazilian Energy Agency, in collaboration with the IFCE-Fortaleza researchers.</p> <p>Financial and economic investments around R\$1.000.000,00</p> |
| <ul style="list-style-type: none"> • EMBRAPII Projects | <p>After EMPRAPII IFCE Polo was inaugurated, the LAR lab started his collaboration with the following private companies.</p> <p>Financial and economic investments around R\$5.000.000,00.</p> |

| | |
|--|--|
| <ul style="list-style-type: none"> • Other projects | <p>Besides these collaborations, the LAR Lab has collaborated with many other institutions in order to find the innovation solutions for them:</p> <ul style="list-style-type: none"> • Atlantico Institute: GISSA Project, supported by FINEP • Avicena Software and Services: GISSA Urgency and Emergency, supported by FUNCAP <p>Nowadays, the LAR Lab two researcher with FUNCAP Productivity Scholarships that involves 10 students and almost R\$300.000,00 for computer material, participation in scientific events and scholarship students.</p> |
| <p>Education Results</p> | <p>Likewise the R&D Results, the Education Results play an important role on the Virtual. However, this kind of results are, naturally, more abstract than the R&D 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.</p> <p>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, as the EMBRAPII projects mentioned before.</p> <p>Anyway, this pedagogical mix experience is much rich in terms of the entrepreneurship skill. It is one very concept for the Virtual Technological Park and is not easier found it in the regular class.</p> |

7. FINAL CONSIDERATIONS

The Virtual Technological Park proposed in this work is based on two perspectives. In the Pedagogical approach are considered the creativity, initiative and management knowledge, important aspects for graduate students independently if they decide to become or not the owner of their business or maybe a public or private employee. The Citizen approach take in account the knowledge about the set up and management of a company and how this can help the students to become a conscious citizen and to collaborate much better to the society.

Actually, this proposal is part of the Call for Participation (BRASIL, 2017) to a Innovation Management Professional (IMP) from the Steinbeis Berlin University, promoted by the SETEC/MEC to IF teachers and administrative people involved in the innovation theme. The aim of this IMP course is the dissemination of the technology transfer cultural in IF environment to help all the IF campi to add the innovation management as regular process in its daily routine.

The results presented are positives towards the Virtual Technological Park objectives and they prove that the FI Mission could be helped in this way.

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

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REFERENCES

ARACATI. **Aracati Digital**. 2018. Available at: <<https://www.aracatidigital.com.br/>> Accessed at: 11 march 2018.

BRASIL. **Chamada Pública 01/2017 SETEC/MEC - IFES Gestão Inovação**. Avail at: <http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=74201-edital-chamada-cp-01-2017-pdf&category_slug=outubro-2017-pdf&Itemid=30192> Accessed at: 11 march 2018.

DOSTLER P; PAVANELLI R. **Inovação e Colaboração. Excelência em Gestão**. Avail at: <<http://steinbeis-sibe.com.br/artigo-inovacao-e-colaboracao-da-revista-excelencia-em-gestao/>> Access at: 11 march 2018.

EMBRAPII. **Embrapii. About us**. Available at: <<http://embrapii.org.br/en/about-us/>> Accessed at: 11 march 2018

IFCE-Aracati. **IFCE Campus Aracati**. 2018. Available at: <<http://ifce.edu.br/aracati>> Accessed at: 11 march 2018.

MINDTOOLS. **Pest Analisis. Identifying "Big Picture" Opportunities and Threats**. Available at: <https://www.mindtools.com/pages/article/newTMC_09.htm> Accessed at: 11 march 2018.

OLIVEIRA, M. **Escola Pra Valer**. ed Barca, BN 978-85-932115-00-1. 2016. Available at: <<https://amauroboliveira.files.wordpress.com/2015/12/escola-pra-valer-web.pdf>> Access at: 11 march 2018.

OLIVEIRA, M; MEDEIROS, B. **Escola Pra Valer ... em tempo de Google**. Revista O POVO Educação. Instituto Albaniza Sarasate. pag 17. 2018 . Available at: <<https://amauroboliveira.wordpress.com/4-barca-extensao/jornal/>> Access: 11 march 2018.

PROFESSIONAL ACADEMY. **Marketing Theories – Boston Consulting Group Matrix** <<https://www.professionalacademy.com/blogs-and-advice/marketing-theories---boston-consulting-group-matrix/>> Access at: 11 march 2018.

SOARES, L.F.G. **III Prêmio LF de Computação**. 2018 Available at: <<https://amauroboliveira.wordpress.com/galeria/meus-amigos/prof-luiz-fernando-lf/>> Access at: 11 march 2018.

STEINBEIS BERLIN UNIVERSITY, 2018. Available at: <<http://www.steinbeis-iec.de/en/steinbeis/steinbeis-university-berlin/>> Access at: 11 march 2018.

VIRTUAL TECHNOLOGICAL PARK. Aracati Digital Video. 2017. Available at: <<https://tinyurl.com/VirtualTechPark>> Access at: 11 march 2018.