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Institutions that foster innovative entrepreneurship in Brazil: mapping and Connections

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Institutions That Foster Innovative Entrepreneurship in Brazil: Mapping and Connections

This paper contemplates the deepening of a research conducted by the Brazilian Micro and Small Business Support Service (SEBRAE) during the 26th Anprotec Conference held in Fortaleza, state of Ceará, in the year of 2016. The research included a method to map out the needs of the Brazilian Innovation Ecosystem and covered ten institutions. For this mapping, a matrix that considers the business development stage model was used to identify key actions and gaps in innovative entrepreneurship fostering in Brazil, also taking five critical business development variables into consideration - technology, talent, finance, location, and evolution. The results point to recurrences and lack of support and contribute with proposals for the Brazilian innovation ecosystem.

It is known that a country's economy can be shaped by different players in an innovation ecosystem, including Research Institutes and Universities, companies, development agencies, public policy agents, accelerators, incubators, and technology parks.

Innovation is facing major challenges in terms of indicators and performance in Brazil. The 2014 Innovation Research (PINTEC) conducted by the Brazilian Institute of Geography and Statistics (IBGE) shows sectoral business performance characteristics and reviews innovation requirements. According to the survey, almost 30% of the assessed businesses implemented innovative and relevant products or processes from 2009 to 2011, thus generating a 35.7% innovation rate. The rate from the previous period (2006 to 2008) was higher, reaching 38%. As it can be noted, this rate, which could have been higher already due to Brazil's entrepreneurship potential, has dropped from one period to another. This aspect is of concern as, while a member of the BRICS, Brazil is a geopolitical reference and its development is directly linked to its entrepreneurial potential.

Another important fact is the limited partnership between Universities and Entrepreneurship concerning Innovation and Technology. Several countries already see as crucial the correlation between entrepreneurial education, technology transfer, and innovation environments. Brazil needs to consider different views and perspectives to create these and other partnerships, which are still in an early stage. The same can be said about the actions taken by other institutions fostering innovative entrepreneurship. Despite countless support groups in Brazil, the actions taken by each organization lack coordination, and their roles and mechanisms are not disseminated properly.

Under those circumstances and based on the experience gained during the 26th Anprotec Conference - National Association of Entities Promoting Innovative Enterprises (held in the city of Fortaleza, state of Ceará - Brazil, in October 2016), where we first mapped out innovation needs with the participation of representatives from ten innovative entrepreneurship fostering entities, this paper is intended to develop and implement a network mapping method of the entities developing innovation mechanisms in the Brazilian innovation ecosystem, identifying these entities as potential transformers along the several business development stages, as well as the main development process variables (technology, talent, finance, infrastructure and market). This mapping was organized and presented in a model that crosses business development stages and analysis of the five main variables, and was based on the "Science Parks as Global Entrepreneurship Platforms" study (Piqué et al., 2008)[86] and on a literature review.

86 Piqué, J. M.; Del Palacio, I.; Sole F, Etzkowitz ,H (2008) Science Parks as Global Entrepreneurship Platforms. Johannesburg: XV IASP World Conference.

The mapping was carried out based on research conducted throughout Brazil, using the articulation and capillarity of Brazilian Micro and Small Business Support Service (SEBRAE), a private entity which has been operating for over 40 years promoting the competitiveness and sustainable development of small businesses. It was implemented by analysts of the Access to Innovation, Technology and Sustainability Unit of SEBRAE in Brazil, under the guidance of experts in related areas.

In order to deepen the participation of all ten entities (Accelerators, co-working spaces, a bank that preferred not to be identified – denominated as "Development Bank" in this paper, FINEP - Studies and Projects Funding Agency, *Anjos do Brasil*, Venture Capital, Incubators, SEBRAE, Businesses and NITs - Technological Innovation Nuclei) represented in SEBRAE Innovation Forum, which took place in the abovementioned Anprotec Conference, after data consolidation, we communicated the conclusions of the Conference and validated them with the entities. Thus, once all ten organizations had been identified, their roles and mechanisms in the four stages and in the five variables of business development were reviewed, and their positioning was consolidated in a single matrix. Simultaneously, the relationship between each of these organizations was addressed, enabling an isolated and a consolidated view of their networking in the Brazilian innovation ecosystem studied.

The results contribute to an organized exposition of the actions and main relationships of the entities identified. It should be noted that the experience gained from this paper can be replicated in countries whose innovation ecosystems need greater clarity as to the roles played and mechanisms developed by their entities, and in the cases where development can be conducive to positive, efficient and effective actions.

This article has been divided in four sections. Part one addresses the Brazilian innovation ecosystem, mentioning key institutions that foster innovative entrepreneurship and their main roles and support mechanisms. Part two outlines the research method and the position of each institution in the business development stage model and in the main business development variables. Part three provides the details and results of the position of each institution within the model and presents their perceptions about what is lacking in the Brazilian innovation ecosystem. Finally, the fourth part includes final discussions on the results obtained.

Key words: innovative entrepreneurship; innovation ecosystem; network of institutions; innovation.

CONTEXT OF THE INNOVATION ECOSYSTEM IN BRAZIL AND THE FOUNDATION THEORIES

Generally, we are constantly searching for Innovation, as a business can better contribute to accelerated growth with higher income and consistent employment generation based on its innovation capacity. Today, Brazil is among the world's twenty largest economies, reflecting an unquestionable entrepreneurial personality. Nevertheless, one question arises: what prevents Brazil from being an effectively innovative nation? Maybe low investment in human development is among the possible answers. A country capable of expand its participation in innovation is a country that invests significant resources in its population (education, health and well-being). An innovation ecosystem facilitates or makes the development of a nation feasible by providing entrepreneurs with a sound basis for innovation. Almost fifteen years ago, UNDP (United Nations Development Programme) prepared the Technology Achievement Index (TAI), measuring a country's technology creation and dissemination potential. Focused on measuring the ability to create technology, TAI assesses which countries are successfully backing these capabilities in five elements: knowledge generation centers, innovation funding centers, interest in entrepreneurship, laws favoring innovation, and which entities are involved in the ecosystem to effectively make innovation happen.

Some of these key elements can be found in Brazil; however, they are not effectively and fully integrated. Brazil is among the emerging countries that most produce scientific knowledge. Nevertheless, the academic and the corporate worlds are still very distant from one another. In China, for example, investment in research also comes from businesses. While seven dollars are invested by businesses in that country, businesses in Brazil invest only two dollars. Brazil is clearly facing a challenge nowadays. Innovating is not easy in an environment of excessive bureaucracy and slow decision making, especially considering the speed of the corporate world, including the world of startups. By reviewing the work of renowned accelerators, including North-American Techstars, we found some suggestions on how to structure and expedite innovation environments. The talent of those involved, the density of the work conducted, the local culture, funding, and the laws that regulate Innovation can be considered.

Based on historic information, the Brazilian national scenario was marked by the 2nd National Science, Technology and Innovation Conference (2002), held in Brasília. At that time, the need for new public policies encouraging innovation environments based on cooperation between the three segments - governmental institutions, private companies, and universities - was quite clear. In this sense, several entities gained new perspectives and sought greater cohesion in this ecosystem. In theory, the Triple Helix concept proposed by Etzkowitz[87] (the Government, private companies, and universities interact in order to innovate) became a reference every time innovation was discussed. After a legal framework was established in the country in 2004, with Acts 10.973 and 11.196 (Innovation Act and Good Will Act)[88], Brazil then had a legal basis for all matters related to RD&I (Research, Development and Innovation) in companies and scientific-technological institutions.

In 2008, during the IASP Conference in Johannesburg, Josep Miguel Piqué, Itxaso Palacio Francesc Solé and Henry Etzkowitz[89] presented an article named *Scientific parks as global entrepreneurship platforms.* Companies inserted in a cluster and the Triple Helix model as base were used in this research. In this theory defined by Etzkowitz and Leydesdorff (2000), and structured under the development of Lundvall (1988)[90], Nelson (1933) and Freeman (1998), interaction between universities, the industry and the Government is believed to be a great solution for the development of societies that are based on knowledge. Historically, it is stated that, similarly to a physical device, the Triple Helix gave rise to venture capital, incubators, and science and technology parks.

The authors of the referred article prepared a model representing the progress in the support to agents involved in the innovation system through every businesses development stage and the main variables of such path - technology, talent, finance, location and evolution/market. Six La Salle Innovation Park born-global companies, in Barcelona, showed that the support to agents varied significantly during development stages in a very interesting way.

The results of the abovementioned research helped identify key support factors for technology startups during each business development stage. Additionally, the results also show the relative importance of agents as supporters and how they offer support. Thus, governments and other organizations can help by improving policies that support technological entrepreneurship. The results

87 Etzkowitz, H., Gulbrandsen, M., Levitt, J., 2000. Public Venture Capital: Government Funding Sources for Technology Entrepreneurs. Harcourt-Brace, New York.

88 Brasil, Lei n. 10.973, de 02 de dezembro de 2004. Estabelece medidas de incentivo à inovação e à pesquisa científica e tecnológica no ambiente produtivo. Diário Oficial da República Federativa do Brasil. Brasília, DF. 2004

89 Piqué,J. M.;Del Palacio, I.; Sole F, Etzkowitz ,H (2008) Science Parks as Global Entrepreneurship Platforms. Johannesburg: XV IASP World Conference.

90 Lundvall, B.-Å., 1988. Innovation as an interactive process: From user-producer interaction to the National Innovation Systems, in Dosi, G., Freeman, C., Nelson, R.R., Silverberg, G. and Soete, L.,(eds.), Technology and Economic Theory, Pinter Publishers, London.

demonstrated that universities, industry and public administration presented different roles during each development stage of a born-global company.

Moreover, the government provided special support in the first inception and launching phase. For subsequent growth and maturity stages, primary support is provided by networks between companies.

In Brazil, in 2014, ANPEI (National Association for Research and Development of Innovative Companies)[91] conducted a study providing a map that identified the main actors of the national Brazilian innovation system and showed flows and interactions regarding relationships between these actors which comprised Government and private institutions from the states of São Paulo, Paraná, Rio Grande do Sul, Santa Catarina, Rio de Janeiro, Espírito Santo, Minas Gerais, Bahia, Alagoas, Federal District, Mato Grosso and Pará. This study aimed at disseminating information and developed a vision of the flows between all the 237 interviewees. The map of the Brazilian innovation system shows the large group of actors with different representative sizes (*businesses*, *scientific-technological institutions* and its subdivisions, *habitats and support*, *class entities, investors, infrastructure* and *government* and its subdivisions - *regulation, development* and *education*) with connections between them in different possibilities of interests - articulation/causes, knowledge, resources/taxes, management support, technology, and infrastructure. For example, the *habitats and support* group is related to *businesses* with management support and *class entities* with articulation/causes and receive inputs of technology (from *scientific-technological institutions*), of resources/taxes (from the *government* and *businesses*) and of infrastructure from the own *infrastructure* (as a group) for establishment/maintenance.

In this ANPEI study, a diagram that reveals the intensities of the relations between the actors (and their subdivisions) was also presented. It is possible to visualize the intensity of the relations - low, medium, high or +high - both inter-actors and intra-actors. In this last case, it is considered the relationships within the large groups (eg large companies, small companies, scientific-technological institutions, among others). When looking at inter-actors relationships, we have the highest one among *large enterprises* and *government-development*, followed by the relationship between *large enterprises* and *class entities*, *large enterprises* and *scientific-technological institutions*, and *small enterprises* and *government-development*. Intra-actor relationships are shown to be stronger within the group of *scientific-technological institutions-knowledge* and within the group of *large firms*.

In addition, cases illustrating the intensity of relations between the actors and a collection of opinions on what is desired in the future were presented. The most frequently answered item was the reduction of bureaucracy. Another clear and well-signaled demand was the need for intersectoral construction. Next, we see the request for a closer approximation of the scientific class of small and medium-sized enterprises. In a collaborative way, the maps remain open to participation for completeness of information.

Currently, Brazil has several entities focused on developing Innovation and Technology, including: CAPES (Coordination for the Improvement of Higher Education Personnel), FINEP (Studies and Projects Funding Agency), CNPQ (National Council for Scientific and Technological Development) as fomenting agencies; FOPROP (Pro-Dean Research and Graduate Studies Forum) and FORTEC (National Forum of Managers of Innovation and Technology Transfer) as forums and technology transfer, and ANPEI (National Association of Innovative Companies), SEBRAE (Brazilian Micro and

91 Anpei. Mapa do Sistema Brasileiro de Inovação. ANPEI, abr. 2017. 27 p. Disponível em <http://www.educanpei.org.br/web/anpei/mapa>. Acesso em: 27 mar. 2017

Small Business Support Service), and Anprotec (National Association of Entities Promoting Innovative Enterprises) as integration agents.

This research aimed at presenting the actions of a relevant group of institutions part of the Brazilian innovation ecosystem within a matrix that takes into account all stages from ideation to business maturity. Entrepreneurship support actions were expected to vary from one stage to the other and from one institution to another, as the realities of institutions framed as Government, universities and businesses/industry were considered.

RESEARCH METHODOLOGY

The research comprised ten innovative entrepreneurship fostering institutions in Brazil and can be considered a case study. According to Yin (2001)[92], a case study can be used when one deliberately wants to work with contextual conditions believing that they are significant and pertinent to the phenomenon studied. A case study is specifically appropriate for research requiring a detailed understanding of social or organizational processes because of the richness of the data collected in the context. This research design is useful when it is important to understand the impact and influence of the organizational and environmental context on social processes (Cassel & Symon, 2004)[93].

The institutions considered in this multiple-case study were chosen from a Forum, part of the 26th Anprotec Conference, which took place in October 2016 in the city of Fortaleza, State of Ceará. This event was co-hosted by SEBRAE in partnership with Anprotec. This association, founded in 1987, has approximately three hundred and fifty associates (technology parks, business incubators, accelerators, teaching and research institutions, public bodies) and plays a crucial role in the articulation of the Brazilian innovation ecosystem.

SEBRAE Innovation Forum, an action part of the Conference addressing different topics on an annual basis, talked about “Challenges when consolidating new spaces and mechanisms to foster innovative entrepreneurship” in 2016. It was attended by two hundred and seventy people and divided into ten Islands that represented great players of the Brazilian innovation ecosystem considered innovative entrepreneurship promoters. Each Island had at least one member representing one institution, which had to present its key development actions to the audience. Players represented in the Islands were: Accelerators - represented by ABRAII (Brazilian Association of Innovation and Investment Accelerators); Co-working spaces - represented by the Impact Hub; Development Bank; FINEP (Studies and Projects Funding Agency); Anjos do Brasil; Venture Capital Investment Funds - represented by ABVCAP (Brazilian Association of Private Equity & Venture Capital); Incubators - represented by SUPERA Incubator; SEBRAE (Brazilian Micro and Small Business Support Service); Businesses - represented by Samsung Brazil; and Technology Innovation Nuclei, part of Universities - represented by FORTEC (National Forum of Managers of Innovation and Technology Transfer).

Data were first collected in a meeting held immediately after the Forum, attended by the ten institutions and guided by Josep Miguel Piqué - lecturer of the 2016 SEBRAE Innovation Forum. At the time, the matrix model (figure 1) was presented, which is the basis for this research and which was developed based on a research authored by Piqué et al., 2008[94].

92 YIN, Robert. K. Estudo de caso: planejamento e métodos. 2. ed. Porto Alegre: Bookman. 2001.
93 CASSEL, Catherine; SYMON, Gillian. Essential guide to qualitative methods in organizational research. London: Sage. 2004.
94 Piqué,J. M.;Del Palacio, I.; Sole F, Etzkowitz ,H (2008) Science Parks as Global Entrepreneurship Platforms. Johannesburg: XV

Figure 1. Model of the matrix used in the research, based on the work of Piqué et al. (2008)[95].

	I - INCEPTION	II - LAUCHING	III - GROWTH	IV - MATURITY
TECH				
TALENT				
FINANCE				
LOCATION				
EVOLUTION /MARKET				

To deepen the business behavioral analysis studied and to obtain comparable results, the authors of the referred study chose five main variables of the business development process. The variables are related to the lines of figure 1 and are described in the reference work as follows (Piqué et al., 2008)[96].

- **Technology** or intellectual property and the characteristics of the R&D.
- **Talent**, meaning among others the educational and professional background of the entrepreneurial team, their global diversity and their organization and roles in the business.
- **Financial** sources and conditions.
- **Location** and connections to technology platforms, as well as the area of influence.
- **Evolution/Market**, evolution of the value chain, sales, and other market and commercial characteristics.

The columns refer to the stages in the general business development model, which divides the process into four stages: conception, launching, growth and maturity.

After presenting the matrix, among other activities and data collection, each institution indicated in which quadrants of the matrix they offered business support. Thus, the matrix model was filled out in ten different ways. In addition, institutions were questioned about the items deemed necessary in the Brazilian innovation ecosystem. Therefore, it was possible to obtain a list of items that can be worked to improve the ecosystem, under the light of relevant players for innovative entrepreneurship fostering.

As part of this research, descriptive procedures were used both to collect data and to develop the analysis. They have been considered descriptive because they report a phenomenon involving its configuration, structure, activities, and seek to illustrate the complexity of the situation and the aspects involved (Godoy; Bandeira-de-Melo; Silva, 2006)[97].

IASP World Conference.
95 Id.
96 Id.
97 GODOI, Christiane K.; BANDEIRA-DE-MELHO, Rodrigo; SILVA, Anielson B. da. Pesquisa qualitativa em estudos organizacionais: paradigmas, estratégias e métodos. São Paulo: Saraiva. 2006

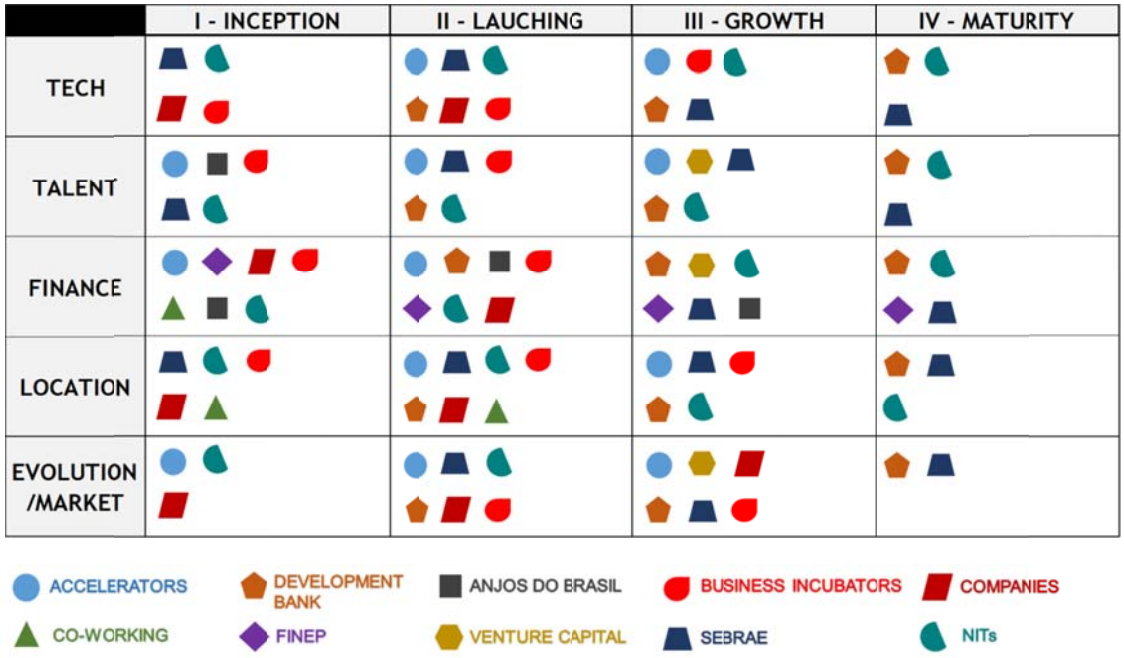
To increase the accuracy and to update the information collected during the Conference, additional data were collected from the institutions to be included herein. This stage occurred between March and April 2017 and counted on the answers given by the institutions studied to questions made by e-mail. The questions were basically used to revalidate the matrix filled out and also to provide a new opportunity to indicate the items missing in the Brazilian innovation ecosystem based on the perception of each institution.

As a result, the consolidated matrix application in all ten entities is presented considering actions to support innovative entrepreneurship in general, without the cut of technological-based ventures considered in the research with companies of La Salle technological park. We also bring to light items that are missing in the Brazilian innovation ecosystem based on the perceptions of the institutions studied and reflections on what can be done to reduce the gaps.

MATRIX APPLICATION AND RESULTS

The consolidated representation of actions supporting the Brazilian innovative entrepreneurship of all ten researched institutions can be found in figure 2. Then, the responses provided and needs shown are detailed in order to improve the Brazilian innovation ecosystem.

Figure 2. Matrix used in the research based on the work of Piqué et al., 2008[98] with the result of the inclusion made by the entities studied.



Accelerators are entitled to support ventures having physical space and infrastructure in the launching and growth phases. Their actions may also be focused on supporting market structuring, from inception to growth. The need of a law ensuring risk investments and lack of fiscal incentive was mentioned when questions about what was missing for the greater integration and better results within the ecosystem. Accelerators believe there is a reasonable number of players investing in the initial phases of businesses; however, resources are

98 Piqué,J. M.;Del Palacio, I.; Sole F, Etzkowitz ,H (2008) Science Parks as Global Entrepreneurship Platforms. Johannesburg: XV IASP World Conference.

necessary to continue growing from the first seed to the proper structure aimed at receiving resources from structured funds (as Venture Capital).

Co-working spaces have a new model focused on the work environment and form of production. Following steps taken by startups, these spaces gather people and different entrepreneurs to work in an environment free from traditional structures. According to ANCEV (National Association of Coworking and Virtual Offices), Brazil already has more than four thousand spaces operating in such way. In the mapping done with the representative of this group, it is possible to perceive the participation in finances in the inception phase and location in the inception and launching phases. The need for a collective agenda of players from this ecosystem and an agreement of players linked to the Government aimed at making the business establishment process simpler was highlighted.

The Development Bank has a historic role in Brazil's advancement. It provides financing for agriculture, trade and services, micro, small and medium businesses, education and health, basic sanitation and environmental projects, as well as public transport in large cities since the 1960s. All variables were provided with support during launching, growth and maturity, except the ventures inception phase in the representative's matrix. Greater integration between the ecosystem agents and forms of ensuring financing to startups are missing in the opinion of the institution.

The Studies and Projects Funding Agency (FINEP) was created in 1967 to provide financing and prepare studies for economic development programs and projects, and focus on improve the technology developed in Brazil. The institution's matrix shows participation in finance throughout all businesses development stages. The representative highlighted the need for improvement in the Venture Capital structure and the creation of credit guarantee funds.

Anjos do Brasil is a non-profit organization acting since 2011 in the country. Its main role is to support startups in their growth phase. The organization is kept by volunteers, sponsors and supporters that promote angel investment within the Brazilian entrepreneurship system. In the matrix filled out by this representative, we obtained the participation in talents in the conception phase and in finances in the first three stages (conception, launch and growth). The institution reports the lack of equity protection and fiscal incentives for angel investors, co-investment funds with angel investors, market liquidity and entrepreneurs better prepared with global view for a better integration and operation of the Brazilian innovation ecosystem.

Venture Capital includes all classes of risk investors. They usually invest in businesses with significant revenue in the growth phase. Their purpose is to help businesses achieve peak commercial expansion. During the research, the group's representative highlighted support to talents, finance and market in the growth stage. They reported the lack of entrepreneurial education, corporate vision to transform good ideas into good businesses meeting the market demand, more incentives for risk investors, regional funds/regional investors, greater interaction of the ecosystem and more resources for early stages (lack of investors in early stage).

Business incubators intend to create or develop micro or small businesses by providing help during the first development stages. In universities, they help projects from scientific and technological developments. In a proper environment, businesses receive advice in all areas required with a complete structure to jump from the initial stage to the more advanced stages. The first incubators emerged in the 1980s in Brazil. Incubators identified themselves as technology (in the inception, launching and growth phases), talents (in the inception and launching phases), finance (in the inception and launching phases), location (in the inception, launching and growth phases) and market (in the launching and growth phases) supporters in our research matrix. This class representative highlighted the need for incentives

for entrepreneurs to access markets; greater connection between the industry and startups; entrepreneurial qualification; interaction between different national ecosystem agents; financial incentives, since interest rates are very high in Brazil and so inhibit investments in risk capital; institutional and legal framework guide possible partnerships between businesses and the academy and a collaborative innovation culture (for example, for open innovation and development covenants).

The Brazilian Micro and Small Business Support Service (SEBRAE) is a non-for profit private organization acting for over forty years in the promotion of competitiveness and sustainable development among small businesses, in the promotion of entrepreneurship. It also acts in the economy formalization process by binding the public and private sectors together. During the research, SEBRAE's representative identified support actions in technology, talent and location for all businesses development phases. SEBRAE supports the growth and maturity phases of financing and the launching, growth and maturity phases of market. The ecosystem gaps included: the need for deeper connection/relationship among scientific-technological institutions and the market/business, lack of public policies adjusted to small businesses reality, greater organized integration between entities with operations targeted to Innovation and, lastly, firm purpose and focus of the ecosystem players on execution and results.

According to sources of the Brazilian Institute for Geography and Statistics (IBGE), Brazil had approximately 5.2 million businesses formalized in 2012. Representing the businesses group considered as Industry in the Triple Helix model, a global company participated and located support actions focused on technology, finances and location in the early phases of businesses development (inception and launching) and on inception, launching and growth of market in the matrix. The gaps observed in the ecosystem included the need for more Intellectual Property institutions, more investors and greater talents inventory.

As determined by the Innovation Law 10.973 from 2014, every Institution of Science and Technology must have its own Technology Innovation Nucleus (NIT) or associated to another institution. The purpose of a NIT is to basically manage the institution's innovation policy and take accountability for the technology transfer. The representative of this category participated in the research highlighted support actions in the four stages of business development for technology, talents, finance and location tracks. Market support is provided in the early phases (inception and launching). The representative believes that actions to reduce bureaucracy, prioritization of personnel formation in technology are missing (since half undergraduates in Public Higher Education Institutions are from law/administration/pedagogy), as well as the strengthening of entrepreneurship facilitation structures within Institutions of Science and Technology.

CONCLUSION AND DISCUSSIONS

The Brazilian innovation ecosystem is relatively new and complex, among other factors, due to the number of players involved and the number of initiatives, sometimes for specific development phases, as noted in this study. According to Arbix (2010)[99], the Brazilian tradition was created to support and encourage scientific research, which became paramount for businesses qualification and the creation of a few economy strategic sectors. However, all the amount involved in these support actions made sense at the time; however, this is a lot different now - due to changes in the world, the society and the State itself. The author believes the low innovation content in terms of economy

99 ARBIX, Glauco. Estratégias de inovação para o desenvolvimento. Tempo Social, revista de sociologia da USP, São Paulo, v. 22, n. 2, p. 167-185, nov. 2010. Disponível em: <http://www.scielo.br/pdf/ts/v22n2/v22n2a09>. Acesso em: 21 abr. 2017.

and most Brazilian businesses is a reason for concern and that even with the recent institutional improvement, the national science, technology and innovation system is still insufficient to transform the knowledge generated in technology research centers, products and services with an impact on the economy, regardless of the sector.

In this multiple-case study, ten institutions fostering the innovative entrepreneurship in Brazil were researched. Some of them represented large groups in the ecosystem, including businesses/industry, accelerators and businesses incubators. Part of the study required institutions to show within the reference matrix - which crosses the four businesses development phases five main variable of the development process.

After fulfilling the symbols created for each institution in the quadrants considered to have actions/projects supporting businesses by the representative in the consolidated matrix, a high concentration of actions can be noted especially in the launching and growth phases. The variable with more support from institutions was the finance. Seven institutions considered to have supported businesses in the launching phase in this variable. With regard to all phases, all institutions showed some form of support. This is a significant amount, even in the research cut out, which had four different representative directly linked to financial support.

Location also presented good support, also with seven institutions in the launching phase quadrant. On the other hand, market/evolution showed less support, especially in the inception and maturity phases. Which, in turn, were the phases with less support from the institutions studied.

The other part asked institution about what was missing in the Brazilian innovation ecosystem. Participants indicated the existence of common gaps. Thus, it is understood that such gaps deserve attention, or some kind of prioritization in order to better develop and improve the ecosystem.

Participating institutions reported more frequently the need to reduce bureaucracy together with a legislation encouraging businesses and investments development, whether through by the tax authorities or other facilitating means. Accordingly, when analyzing the themed ranking of what is desired by players in the future reduced bureaucracy appeared with the highest percentage of answers in the survey conducted by ANPEI with 237 players, which was mentioned in the first part of this article. Another clear widely provided answer in ANPEI's study was the need for intersectoral construction. Then, there is the need to request a greater approximation of the scientific class to small and medium businesses.

Lack of investments and opportunities of sources of resources is also noted by more than half of the institutions researched. In this regard, we had general and other specific answers not always under the same point of view. For accelerators, there is a lack of investments from the first businesses recruitment to the necessary robustness to access venture capital funds in the death valley step. On the other hand, the venture capital funds representative believes that there is a lack of resources for the early phases of ventures.

When observing the financial part of the matrix, an agglomeration of support actions in the inception and launching phases can be noted, which are reduced in later phases (growth and maturity). In any case, the indications of support provided by the institutions researched are not necessary linked to effective investment or resources release for businesses.

An item was widely considered as missing in the Brazilian innovation ecosystem: integration between fostering institutions and players in general. An integration gap in the agenda of players focused on

innovation in Brazil can be noted. This may lead to rework, confusion of responsibilities related to each role and difficulty in understanding and access by the main stakeholders: the entrepreneurs.

Another frequently highlighted item can be included in the group of businesses qualification needs, thus increasing the qualification of entrepreneurs to act systemically with a global market vision. This, along with the need to prioritize technology formation and a structured inclusion of the entrepreneurship theme in Institutions of Science and Technology. One of the institutions researched also reported the lack of talents inventory for education and qualification in Brazil.

The need of adequacy in public policies and legislation focused on accessibility for every business (from micro to small and even the most developed ones) to technology and innovation inputs was also highlighted. The lack of intellectual property institutions was another unique consideration made by the businesses' representatives.

Also related to this gap is the current average time for patents approval in Brazil, which reached 10 years. Such slowness for the idea advocated by the intellectual property and the useful lifecycle of an innovation is a paradox and a clear bottleneck within an important mechanism for competitiveness and innovation. Initiatives have already been conducted to soften the backlog situation, such as the preferential analysis of small businesses patent applications even as a form of creating and protecting their innovation as most applications submitted currently to INPI - Brazilian Institute of Industrial Property - come from large businesses and universities. However, this action is not targeted to reach the root cause and the Government is mainly entitled to seek solutions for this, as the Institute is directly linked to MDIC - Ministry of Development, Industry and Foreign Trade. For such, noting the importance of INPI's work for the economy is the main step towards establishing improvements, such as increased number of applications evaluators and the general infrastructure necessary to increase the analysis flow.

We would also like to comment on some points made by the institutions studied and provide proposals. We believe the insistence culture could also be added on the gaps related to education and qualification. Brazil is not culturally prepared to fail; error has a more negative connotation than that of learning, which ends up interfering directly in the quantity, quality and type of local entrepreneurship. Cultural change is extremely complex and may take generations to become a reality. However, the idea that making mistakes is part of the process and may provide benefits and growth could be implemented in entrepreneurship subjects, schools and universities. It should also be worked by large entities fostering entrepreneurship and innovation such as the Ministries of Science, Technology, Innovation and Communications and Development, Industry and Trade, and SEBRAE together with the S System (set of institutions of interest for production sectors).

In line with this, including specific entrepreneurship subjects in Institutions of Science and Technology curricula and in public and private high schools is a structural change action that would bring medium and long-term benefits to the reality of Brazilian entrepreneurship and the view of the population in relation to businesses. Brazil was currently able to reverse the majority proportion of entrepreneurship by necessity for entrepreneurship by opportunity according to the GEM (Global Entrepreneurship Monitor)[100] research conducted in 2015; the proportion of entrepreneurs by opportunity compared to the initial rate of entrepreneurs was 56.5%. Such proportion reduced significantly compared to the previous three years, when it remained close to 70%. Overcoming 50% is a victory for our country and we must bear in mind that such proportion of entrepreneurship by opportunity can be even higher and reach the majority of cases. Encouraging the creation of

[100] Global Entrepreneurship Monitor. Empreendedorismo no Brasil 2015. Brasília, DF: GEM. 2015.

technology courses may also transform the reality of Brazilian entrepreneurship in the future. Increasing the offer of courses that will change the knowledge base of the population is necessary.

Bureaucracy is seen as an obstacle to the ideal flow of actions promoting innovative entrepreneurship and entrepreneurship itself. We think it must go beyond positive initiatives already being implemented in Brazil as Lei Geral (General Law) - created by the Lei Complementar Federal (Federal Supplementary Law) 123/2006 - which provides for favored, simplified and differentiated treatment for small businesses, or the example of REDESIM - business owner - National Network for the Simplification of Registration and Legalization of Companies and Businesses, which streamlines and integrated businesses and business owners registry and legalization process. A reduced number of steps and agencies to report when starting a business is also essential to not discourage the potential for businesses creation, as well as to change the tax burden for entrepreneurs.

Government initiatives aimed at providing more safety and encourage investors could increase the volume of investors and resources invested in ventures countrywide, thus changing the proportion of expenses, including in R&D which - according to a report prepared by the Ministry of Science, Technology, Innovation and Communication (MCTIC) - counts on the Brazilian Government as the main source, while in countries more technologically dynamic (as Japan, Korea, USA, Germany and China) 70% of R&D expenses are paid by businesses.

To improve the level and quality of integration of efforts between players of the Brazilian innovation ecosystem, we suggest a structured and detailed sharing of information as the first step towards the convergence of actions, thus avoiding the overlapping of initiatives and increasing the chance of forming a partnership for complementary or joint work. The School of Administration of Getúlio Vargas Foundation (FGV-EAESP) has recently launched a mapping platform called Mapped in Brazil[101], which links any organization part of the entrepreneurship ecosystem in the country. The website is free-registration crowdsourcing for players and has a curatorship of the institution with the aim of increasing transparency in the entrepreneurial ecosystem. This is an excellent initiative for businesses seeking support to innovate and may be considered/integrated when deepen information to be shared. Such as a platform exposing players of the Brazilian innovation ecosystem with structured descriptions of institutions and their main projects/promotion actions, standardized fields and curatorship, as well as updates under the responsibility of one institution, which could also be SEBRAE itself.

Lastly, institutions fostering innovative entrepreneurship in Brazil may implement the mission-oriented policy. According to CGEE - Center for Strategic Studies and Management - study conducted in 2015[102]: “mission-oriented policies can be defined as systemic public policies that draw on frontier knowledge to attain specific goals or ‘big science deployed to meet big problems’.” In agreement with the defense of this study, for Brazil, this new mission-oriented approach means developing, implementing and monitoring a strategic innovation policy program that draws on the strengths of its innovation system to overcome the country’s weaknesses and address its challenges, seizing the opportunities offered by such a vast and richly endowed country. It requires putting innovation at the heart of economic growth policy.

[101] FGV-EAESP, Escola de Administração de Empresas da Fundação Getúlio Vargas; SARFATI, Gilberto. Mapped in Brazil: Entrepreneurial ecosystem in Brazil. Disponível em: <http://www.mappedinbrasil.com.br/>. Acesso em: 19 abr. 2017.

[102] MAZZUCATO, Mariana; PENNA, Caetano. The Brazilian Innovation System: A Mission-Oriented Policy Proposal. Avaliação de Programas em CT&I. Apoio ao Programa Nacional de Ciência (Plataformas de conhecimento). Brasília, DF: Centro de Gestão e Estudos Estratégicos. 2015.

This paper can be used as a basis for future works developed by SEBRAE or any other institution interested in sharing knowledge and facts on support programs and the Brazilian innovation ecosystem. It can also be deepened or resumed in partnership also considering even more players already framed in large Triple Helix groups, for example.

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