

# **GOVERNANCE PROPOSAL FOR AN INNOVATION CENTER INSERTED IN A REFERRED ECOSYSTEM: THE CASE OF MACEIÓ**

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## **ABSTRACT**

*As an important economic and social transformation strategy that has been adopted throughout the world, the formation of local innovation ecosystems constitutes a network of cooperation in favor of local development through the innovation economy formed by different types of actors. Among these actors, innovation habitats stand out, in particular, innovation centers that bring together in a single location several mechanisms, programs and other habitats in one place, and can thus become an epicenter of innovation ecosystems. However, depending on the degree of maturity of the ecosystem, the management and integration of an innovation center may have certain difficulties in its execution, therefore, this article presents a governance model, called hive, based on the case of the innovation center Jaraguá in Maceió/AL, recently launched within an ecosystem still under construction. At the end, a unique new look at the governance of an innovation center in a reference ecosystem is launched, demonstrating its main obstacles, strengths and how the flow of knowledge is developed in it.*

**Keywords:** Innovation Center; Governance; Local Innovation Ecosystem; Beehive Model; Innovation Habitats;

## **1. INTRODUCTION**

In the current political economic situation, the innovation process permeates the mechanisms that induce innovative and sustainable development in a given region, which Etzkowitz and Leydesdorff (2000) characterized as an innovation ecosystem and considered them also as a network of relationships in which information and talent flows through sustained value co-creation systems. Jishnu, Gilhotra and Mishra (2011) and Russell et al. (2011) add that innovation ecosystems refer to the interorganizational, political, economic, environmental and technological systems of innovation, in which there is catalysis, support and support for business growth. Within this discussion on innovation ecosystems, the presence of innovation habitats is highlighted, which can be defined as environments created to provide favorable conditions for innovation, and these actors are fundamental to potentialize the innovation ecosystem (TEIXEIRA et. al., 2017) . Among the different types of habitats, the innovation centers have a strong connection with these ecosystems as they have the function of creating an innovative and entrepreneurial culture; activate the innovation ecosystem; and generate and scale innovative businesses to transform the economy of a given territory and/or region (SANTA CATARINA, 2017).

The Florianópolis innovation network stands out in Brazil, the result of the partnership between the Municipality of Florianópolis and ACATE (Santa Catarina Association of Technology), which integrate four innovation centers with the aim of stimulating a culture of innovation and entrepreneurship, activating the innovation ecosystem, generating and scaling innovative business, in addition to essential functions established in municipal and state innovation policies, such as training in ST&I (science, technology and innovation), technology and innovation events and marathons, increased access to investors and attracting business to the city (REDE DE INOVAÇÃO FLORIANÓPOLIS, 2021). With private management, the Innovation Centers are different from other Brazilian initiatives, such as those carried out in Maceió and in the State of Santa Catarina. The Jaraguá Innovation Center was created by the State Secretariat of Science, Technology and Innovation of Alagoas (SECTI) to promote entrepreneurship and innovation in the state of Alagoas, fostering or incubating technology-based companies, creating jobs and generating business, guiding the technology sector installed in the state in order to meet the demands of society, as shown in its official website (PARQUE TECNOLÓGICO DE ALAGOAS, 2021). However, one of the challenges presented is with a view to the form of management of this space, since the public characteristic implies some challenges for the innovation agenda. Furthermore, as an environment that will benefit the entire local ecosystem, it is understood that governance should consider these characteristics. So, this study sought to develop a proposal for a governance model for the Innovation Center of Jaraguá - Alagoas.

## **2- THEORETICAL FRAMEWORK**

Moore, in 1993, was the first to use the metaphors of natural ecosystems to try to explain the market dynamics that formed around innovation. What was initially called the business ecosystem was redefined as the innovation ecosystem, and several authors began to conceptualize what would be the same (GOMES et. al., 2018; RITALA, ALMPANOPOULU, 2017).

An innovation ecosystem consists of a group of local actors and dynamic processes, which together produce solutions to different challenges, and its main characteristics are that: they include universities and high-level research institutions; sufficient funding for new companies and research plans; a symbiotic combination of large established companies and the birth of startups; specialization and cooperation between companies; services specialized in the needs of local companies; a sufficient local market for innovative new products; access to the global network; and a sense that the individual success of each entrepreneur is linked to the success of the entire region (OKSANEN, HAUTAMÄKI, 2014).

There are several approaches in the literature on how innovation ecosystems can be structured. Etzkowitz (2003) proposed the Triple Helix, where government, university and business society interact in a network, showing the need to generate a knowledge infrastructure in order to develop an environment conducive to innovation, with initiatives aimed at economic and social development (AUDY, 2011). In fact, currently, a new format called the five-fold helix is being debated, where aspects of civil society are inserted in two more helices. In the "Fourth Helix", there is the perspective of the knowledge society and in the "Fifth Helix" there is an emphasis on the socio-ecological perspective of society's natural environments (CARAYANIS; CAMPBELL, 2011; FIATES et. al., 2017).

Regardless of the ecosystem structuring format, it is formed by several actors. Teixeira et. al. (2017) classifies the actors in an innovation ecosystem into: audiences; of knowledge; institutional; of promotion; business; from civil society; and innovation habitats.

According to ANPROTEC (2020), innovation habitats are regarded as organizations, programs or initiatives to generate innovative ventures and support the development of technology-based start-up companies, which are based on technological differentials or seek to solve problems or challenges social and environmental, through support to transform ideas into successful ventures. Among them we have: incubators, accelerators, coworkings, living labs, spaces makers, innovation centers and others. Specifically dealing with the innovation centers that began to gain notoriety as an innovation mechanism from the 1980s in Germany, where they initially emerged, and later spread to other European countries (ABDALA et. al., 2018; FERREIRA and TEIXEIRA, 2020), Abdala et al. (2018) characterize an innovation center as a physical or virtual community that allocates, for limited periods, potential innovative entrepreneurs, startups or specific R&D projects of established companies, where knowledge is centralized and directed to the culture of innovation and entrepreneurship. Above all, it seeks to support the development, production and marketing of high-quality technological services, processes and products focused on intelligent specialization in the region. For this purpose, Thus, it is important to emphasize that according to Abdala et. al. (2018), the four basic functions of an innovation center are: to promote regional development; develop innovation by generating new business; provide shared facilities, services and resources; and promote a culture of innovation and entrepreneurship.

However, it is necessary to emphasize that the Innovation Centers, despite offering several services and infrastructure that develop innovation through business, on the other hand, do not solve all the complexity of a science, technology and innovation policy in isolation (ABDALA et al, 2018) thus operating together with other actors in the ecosystem (FERREIRA and TEIXEIRA, 2020). Therefore, the importance of having structured, healthy and efficient governance ahead of both innovation ecosystems and habitats.

Ansell and Gash (2008) establish that governance is when one or more public bodies directly involve non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public or manage programs or public assets. Emerson et.al. (2012) have improved this concept by defining governance as processes and structures of political decision-making and management that constructively involve people across the boundaries of public, private and civic spheres in order to realize a public purpose that otherwise could not be accomplished. Inspired by the life of bees, Marinho (2014) proposes a governance model homonymously called BEEHIVE for local innovation ecosystems. This model tries to absorb the principles of the social structure of a hive where insects live in an organized way, have defined functions, acting cooperatively for the survival and maintenance of society. In addition, it is clear that the alveoli of the hives are designed in a hexagonal format in order to fit perfectly, determining the natural law of minimum effort and maximum yield, bringing the idea of a synergy, whose fittings complement each other resulting in combs that cooperate for processing honey.

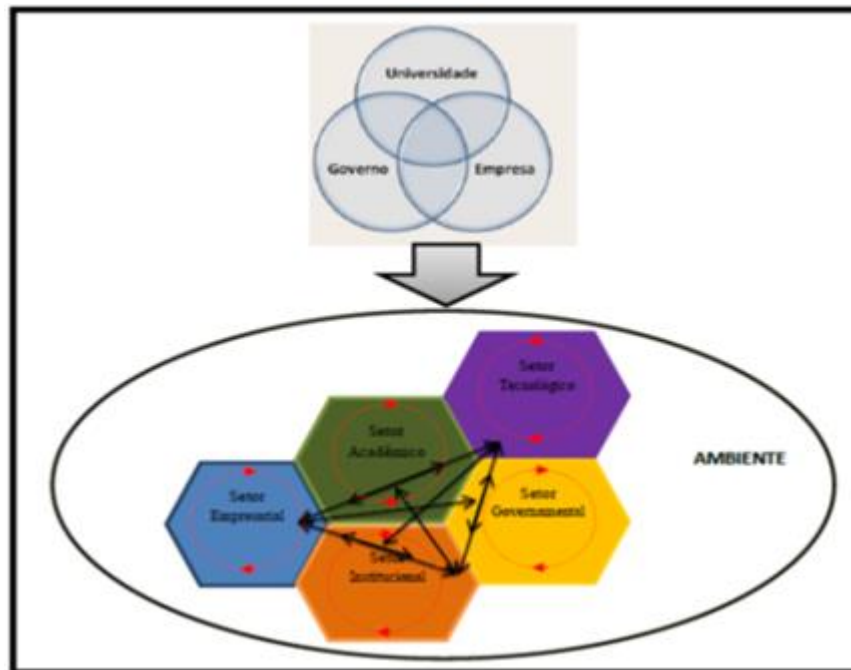


Figure 01- From the Triple Helix to the Beehive Model

Source: Marine, 2014.

The Beehive model expands the Triple Helix by inserting the institutional and technological sectors, according to the studies by Labiak (2012) on the regional innovation system in Paraná, establishing the following classifications: Academic sector, composed of actors responsible for teaching for the training of human Resources; Business sector, constituted by the productive units of the sectors of industry, commerce and services; Institutional sector, public and private actors responsible for intermediating activities that develop innovation among the other actors in the system; Technological sector: actors responsible for supporting and developing technology and transferring it to companies; Government sector, formed by the three government spheres whose objective is to define and implement policies, induce and enable strategic projects, create mechanisms and infrastructure to encourage business implementation. The proposal of the hive model is one of cooperation, that is, an environment of synergy, sharing of knowledge, skills and resources in favor of a context conducive to innovation (BALESTRIN, 2005), whose hexagon shape suggests the maximization of resources and lower cost.

### **3 – METHODOLOGY**

This article presents a qualitative-descriptive research, with an exploratory methodology with a documentary and bibliographic approach, with a view to offering means that help in the definition and resolution of the problems presented and allow subsidizing the discussion of themes that have not been sufficiently crystallized. As a tool, a vast bibliographic research was carried out, based on published material, consisting mainly of books, journal articles and materials available on the internet; and documentary research prepared from materials that have not received analytical treatment, such as documents, technical reports, records, among others. To identify the existing structure in Alagoas capable of composing the innovation ecosystem and corroborate the activities of the Jaraguá Innovation Center, it

was necessary to understand the current scenario, in order to propose a governance model close to the local reality. Thus, the actors involved were mapped and then some “instruments” that can contribute directly or indirectly. with the development of the local ecosystem, then assessing the correlation between them and how they collaborate with the Local Innovation Ecosystem and, mainly, with the Jaraguá Innovation Center. The term “instrument” will be adopted to facilitate the approach, as it includes different configurations such as notices, programs, networks, among others. The choice was based on structuring and encouraging innovation, as shown in Table 2.

#### 4 – RESULTS AND DISCUSSIONS

A mapping of the main actors of the local innovation ecosystem in Maceió was carried out, which can be seen in table 01.

**Table 01 – Mapping of Ecosystem Actors in Maceió**

SECTOR	CLASSIFICATION	ACTOR	DESCRIPTION
Academia	HEI	UFAL	Federal University of Alagoas
Academia	HEI	UNIT	Tiradentes University Center
Academia	HEI	UNEAL	State University of Alagoas
Academia	HEI	UNINASAU	Maurício de Nassau University Center
Academia	HEI	ESTATIO	Estacio Faculty
Academia	HEI	FAT	Mário Jucá University Center
Academia	HEI	IFAL	Federal Institute of Alagoas
Academia	HEI	UNCISAL	State University of Health Sciences of Alagoas
Business	company/service	Inform Systems	Company
Business	company/service	jet data	Company

Business	company/service	Printer Center	Company
Business	company/service	Hand Talk	Company
Business	company/service	Trakto	Company
Business	company/service	Ilhasoft	Company
Business	company/service	Connect Automation	Company
Business	company/service	super cash	Company
Business	company/industry	ILLA	Company
Business	company/industry	Braskem	Company
Governmental	Government	SECTI	State Secretariat of Science, Technology and of Innovation
Governmental	Government	GGOV	Government Office of the City of Maceio
Governmental	Development Agency	FAPEAL	State of Alagoas Research Support Foundation
Governmental	Development Agency	Develop	Alagoas Development Agency
Governmental	Government	SECULT	State Department of Culture
Governmental	Government	HEADQUARTERS	Secretariat of Economic Development and Tourism

Governmental	Government	FMAC	Municipal Foundation for Cultural Action
Institutional	Supporting Entity	CMCT&I	City Council of Science Technology and Maceio Innovation
Institutional	Supporting Entity	CJE	Young Entrepreneurs Council from Alagoas
Institutional	System S	IEL	Euvaldo Lodi Institute
Institutional	System S	SENAI	National Industry Service
Institutional	System S	FIEA	Federation of Industry of Alagoas
Institutional	System S	SENAR	National Rural Learning Service
Institutional	System S	FECOMMERCE	Federation of Commerce of the State of Alagoas
Institutional	System S	SENAC	National Commercial Learning Service
Institutional	System S	SESC	Social Service for Commerce
Institutional	Development Agency	Fundepes	University Foundation for Extension and Research Development

Institutional	Development Agency	Northeast Bank	Financial institution
Institutional	Supporting Entity	FEJEA	Federation of Junior Companies of the State of Alagoas
Institutional	System S	SEBRAE	Brazilian Micro and Small Business Support Service
Institutional	Representation of Geographical Indication (GI)	inbordal	Filé das Lagoas Embroidery Institute Mundaú-Manguaba
Institutional	Representation of Geographical Indication (GI)	unipropolis	Union of red propolis producers in the State of Alagoas.
Technological	Innovation Environments	INCUBAL/UFAL	Incubator
Technological	Innovation Environments	INOVIFAL/IFAL	Incubator
Technological	Innovation Environments	UNITEC/UNCISAL	Incubator
Technological	Innovation Environments	IET/CESMAC	Incubator
Technological	ICT	BRIDGE	BRIDGE Institute

Source: Prepared by the authors.

Table 2 presents the offer of innovation support instruments available in the State for the productive sector, together with its general objectives, which are executed by actors of the Local Innovation Ecosystem to be accessed by the business sector.



**Table 02 - Implementing instruments that promote innovative activity in Maceió**

<b>INSTRUMENT</b>	<b>EXECUTION</b>	<b>MAIN GOAL</b>
Research Program for the SUS: shared health management (PPSUS)	FAPEAL	Financially support research projects that promote the improvement of the quality of health care in the state of Alagoas, representing a significant contribution to the development of Science Technology and Innovation in Health (CT&IS) in the context of the Unified Health System (SUS).
Business Mobilization for Innovation - MEI	CNI/FIEA	Movement of entrepreneurs that aims to awaken top corporate executives to the importance of a positive innovation agenda.
Local Innovation Agents Program - ALI	SEBRAE	Its purpose is to increase the competitiveness of participating companies by promoting innovation in companies through the dissemination of information.
Startups and Digital Economy Project	SEBRAE	Promotion and development of businesses linked to the digital economy.
Technova	FAPEAL / SEBRAE / IEL	Public selection of proposals to support technological innovation in micro and small businesses.
Innovative Brazil.	FEDERAL GOVERNMENT / SEBRAE / ANPROTEC	Conceived and articulated to become a public management tool that performs acceleration, connection, visibility and mentoring for startups throughout the country.

Embrapii Initiative (Brazilian Company for Industrial Research and Innovation)	SEBRAE/EMBRAPII	Contribute to the development of innovation and competitiveness of the Brazilian industry by meeting the demands for innovation in the productive sector.
Creative Networks Project.	SEBRAE	Promotion and development of creative ventures.
PPG Company	FAPEAL	Support, through the granting of economic subsidy resources, the development of innovative products and/or processes - new or significantly improved by Brazilian companies for the development of economic sectors considered strategic in federal public policies and adhering to the state's public policy on innovation.
Social and Environmental Impact Business Project - NISA	SEBRAE	Promotion and development of businesses with social and environmental impact, technologically based or not.
Spark AL Program	FAPEAL / SECTI / SEBRAE / IEL / FIEA	Stimulate innovative entrepreneurship through training for the development of innovative products or processes and support, through the granting of economic subsidy resources, the generation of technology-based companies, from the transformation of innovative ideas into ventures that incorporate new technologies to strategic economic sectors of the state of Alagoas.

Impact Innovation	FEDERAL GOVERNMENT / SEBRAE / ANPROTEC	InovAtiva de Impacto is a different part of the InovAtiva Brasil Program, focused on the social and environmental impact theme.
Creative Economy Notice.	FAPEAL/SEBRAE	Support, through the granting of economic subsidy resources: (1) the development of innovative cultural/creative goods and services and (2) the significant improvement of existing cultural/creative goods and services.
Innovation-promoting Environments and Territories Project.	SEBRAE	Promote the development of local innovation ecosystems, as well as foster public policies, programs and actions for the development of innovation, in addition to helping the development of the municipality's innovation habitats
IDEAZ	FEDERAL GOVERNMENT / SEBRAE / ANPROTEC	Selection of innovative projects with social and environmental impact in the ideation stage to support incubators and accelerators accredited by the program.
CATALISA	SEBRAE	Select researches with potential for technological innovation that aim to significantly contribute to innovation in the country, as provided for in the first Stage of CATALISA ICT: "Mobilize and Awaken to Entrepreneurship".

Source: Prepared by the authors.

However, it is noteworthy that the actions listed end up having little effectiveness in fostering innovation, if there is no integration within the local ecosystem. Therefore, principles such as collaboration, sharing, collective purpose, among others, should guide the organization, decisions and actions of an innovation center (SANTA CATARINA, 2017). Therefore, the proposition of the hive model seems to be adequate for a governance carried out with different actors from the ecosystem, but with a common proposition. According to Marinho (2014), the proposed beehive model is an environment of cooperation, synergy, sharing of knowledge, skills and availability of resources in favor of innovation. The hexagon shape suggests a model of integrated and networked systems, with joint actions and intra-sector collaboration intrasectorial, intersectorial and interinstitutional that can facilitate the complementarity and provide better results between the actors, strengthening the ecosystem and, consequently, developing the region.

According to Abdala et al (2016), an innovation center, among other objectives, promotes a culture and connection of innovation and entrepreneurship when it fosters the network, creating alliances and synergy between companies, entrepreneurs, investors and scientific research at the university and other actors, contributing to formation of a territory that generates systematically innovative entrepreneurs, products, processes and services, as happens, for example, in Silicon Valley, in the USA, in Tel Aviv, in the Middle East, or in Singapore, in Southeast Asia (SANTA CATARINA, 2017). In other words, innovation is mediated by a joint and cooperative action between different actors of a public or private nature, as stated by Viotti (2003).

The Jaraguá IC will be able to make use of this model, which can be adaptable and is in accordance with the objective of the IC and the Local Innovation Ecosystem mentioned above. Understanding how each alveolus can contribute to satisfactory actions and results is what will be discussed below. The academic sector, represented by higher education institutions and ST&I institutions, is an important driving force of knowledge, whose intertwining between teaching and scientific research may result in technological development, using programs such as CATALISA, IDEIAZ and CENTELHA, for example, and foster business or innovation within companies, producing knowledge that can be transformed into technology, as it is appropriated by companies in their competitive strategies through innovation. Interactions can be stimulated by the INCUBATORS, NITs and programs such as CREATIVE ECONOMY NOTICE, TECNOVA, INOVATIVA, PPG EMPRESA and PPSUS.

The government is important, as it is capable of defining and implementing policies, inducing and enabling strategic projects, creating mechanisms and infrastructures to encourage business implementation, such as the Jaraguá IC, which can implement a process of interaction between actors able to use the human, financial, material and technological resources available to reach those through institutions such as DESENVOLVE, SECTI, GGOV and FAPEAL.

The institutional is constituted by public and private actors of paramount importance that have mostly seats in Councils of great relevance to the theme, facilitating articulations and actions between the other actors, they are executors of public notices and programs that involve the promotion and diffusion of innovations between the other actors in the system, such as the “S” System and FUNDEPES.

As for technology, there are the actors responsible for supporting and developing technologies and transferring them to companies, such as the INCUBATORS Network, which is capable of carrying out

joint actions such as training, fundraising, sharing of infrastructure; the Network of NITs, capable of protecting the intellectual property of these institutions and promoting the transfer of research results to the business sector, seeking to strengthen and expand their insertion (TONHOLO, et al, 2014). Also noteworthy in this alveolus is the BRIDGE Institute, which conducts studies, research and generates the knowledge necessary to train professionals to transform the environments and companies in which they work, and the EMBRAPII INITIATIVE, which fosters innovation through partnerships between companies and institutions of public and private research, in order to serve the productive sector.

On the other hand, the business sector, constituted by the productive units of the sectors of industry, commerce and services, assumes that innovation occurs as a result of interactions and available instruments, here the most active ones were identified and mostly from the startup movement, namely Hand Talk, Trakto and Ilhasoft etc. Based on the hive model, it can be said that it is in this sector that the “innovation process” has its objective achieved when it comes to improvement or the creation of new products, processes and services. However, the continuity of the innovation process is linked to the feedback of entrepreneurs with the ecosystem, as there is a business perception of innovation as strategic for the development of the ability to compete.

Faced with previously frustrated attempts, the model proposed here arises with the aim of mitigating the isolation, the lack of interaction and cooperation between the actors in the ecosystem that could contribute considerably to the success of the Jaraguá Innovation Center. Even each alveolus working separately, everyone must understand and work with a single objective, that of inducing the innovative process in business organizations that will use the instruments to foster innovation more efficiently and effectively, being able to collaborate and contribute to the different processes that permeate the initiatives at the Jaraguá IC. That said, after classifying the available actors, identifying the instruments that together with the actors promote the process of innovation in the business sector, it is possible to apply the idea in the innovation center, working the dialogues between the actors, understanding the need of the productive sector, adapting models for the Jaraguá IC to fulfill its role in the local innovation ecosystem, understanding that each of its alveoli has a preponderant role in the dissemination of the innovation culture and in the development of the region, thus giving rise to intra-sectorial relationships.

Regarding intra-sectorial relationships, it is possible to map and identify institutions with the same goals and adjust them together to maximize resources and achieve more “robust” results without expending as much energy. After the strengthening of each sector, through the exchange of experiences and knowledge, it is possible for each organization to make available/share resources and/or infrastructure according to the availability and expertise of each involved. When this happens, intersectorial relationships are materialized, and with them the principles of collaboration, sharing and collective purpose, among others, that govern a center of innovation, supporting the hive model represented in Figure 02.

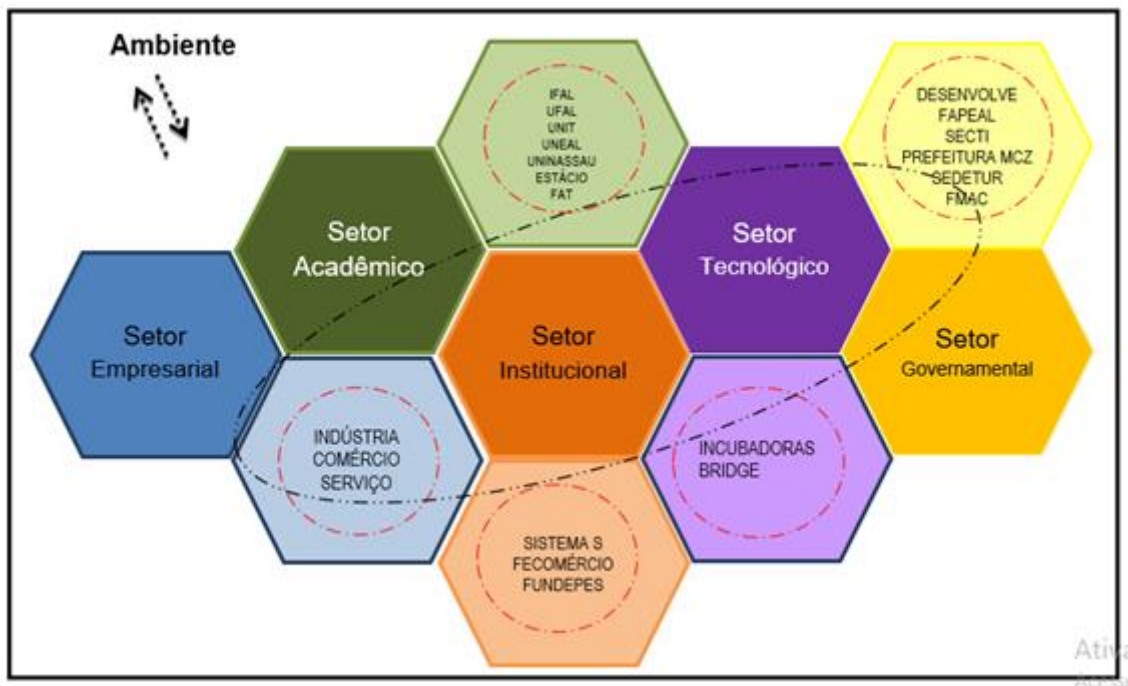


Figure 02 - Governance Model for the Innovation Center of Alagoas Represented by Colmeia  
 Source: Adapted from Marinho (2014).

The Beehive Model proposes an expansion and adaptation of the Triple Helix model in order to add more elements that support future studies to assess the performance of the local ecosystem. Knowing the ecosystem is the first step in activating and developing it. The mapping allowed us to visualize the actors that are already in the field, what actions are being carried out, know the key people who work in each alveolus and understand who will be impacted by the actions of the Center (SANTA CATARINA, 2017). Figure 2 also expresses the possibilities of intrasectorial interactions, represented by the dashed lines in red, and the intersectorial ones represented by the black dashed lines. These interactions allow evaluating the Maturity Degree of the Ecosystem, that is, measuring the performance of the Alagoas ecosystem through the detailed analysis of each alveolus, representing the second step of ecosystem activation which, in the case of Maceió, will be able to analyze how the elements are acting. of the ecosystem and how they have been related and generated results from collaboration (SANTA CATARINA, 2017), or if there are overlapping actions, characterizing rework, waste of resources and, consequently, compromising the effectiveness of actions.

## 5 – CONCLUSIONS

Maceió has been transforming, in recent years, within the scenario of science, technology and innovation. It took an important leap in the execution of actions and instruments that contribute to the consolidation of the local ecosystem. Therefore, the Beehive Model becomes useful to identify stakeholders, interrelationships and support structures essential to the implementation and continuity of the innovative process.

Despite the important steps that have been taken, Maceió needs to make better use of the CT&I infrastructure, such as the Jaraguá IC, which through coordinated actions can lead to cooperative

interactions between the organizations in the system, whose objectives are to minimize efforts and resources and maximizing the results of actions, expanding inter-institutional relations and establishing a more adequate degree of synergy to contribute to innovation processes within companies and, consequently, to the sustained development of the state.

As mentioned before, the hive model proposes a new look in order to add more elements that support the activation and development of the ecosystem. However, the development and maturity of the ecosystem will depend on the importance attributed by actors to the financing of innovation, the development of human capital, an effective governance that can align actions in a cooperative way between and in the alveoli to obtain a result in favor of development the innovative process and the effective functioning of the ecosystem. As previously mentioned, an innovation center can be the geodesic epicenter of the local innovation ecosystem, however, it alone does not solve the problems of effectiveness and integration present in a given territory.

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