TRIPLEHELIX
UNIVERSITY INDUSTRY GOVERNMENT association

FEAUSP

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TITLE: Innovation ecosystem: Metamodel for orchestration.

TYPE (a. original research, b. research Design or c. practical case / experience analysis)

TRACK: Triple Helix in the age of Digital Transformation, Industry 4.0 and Innovation Ecosystems.

PURPOSE: Present a set of functions that an innovation ecosystem must develop to mature the performance of its agents.

DESIGN/METHODOLOGY/APPROACH: The methodology used to appear as qualitative, bibliographic and exploratory. Qualitative research is a set of interpretative techniques that aim to describe and decode components of a complex system of meanings (Lakatos & Marconi, 2010). Bibliographic research covers the scientific work already made public in relation to the subject of study, from single publications, newsletters, newspapers, magazines, books, research, monographs, theses, etc. Its purpose is to put the researcher in direct contact with everything that has been written, said or filmed on a given subject (Lakatos & Marconi, 2010). Exploratory research, according to Gil (2002, p.42), "aims to provide greater familiarity with the problem, with a view to making it more explicit or constituting hypotheses".

FINDINGS OR EXPECTED OUTCOMES: From the realization of this research, 10 functions were defined that are expected in an innovation ecosystem. The 10 functions are: i) information, ii) innovation, iii) investment, iv) internationalization, v) sectors, vi) talent, vii) territory, viii) society, ix) state networks (governance) and, x) international networks. For each of these functions are sub functions detailed, defining them (What?), Expressing why they were aggregated (Why?) And incorporating an inspiration case for each one of them (Who, How, Where). From this set of functions, it is possible to develop an innovation ecosystem to provide maturity in the performance of its agents. In addition to exploring the 10 functions and their subfunctions, the research presents 10 items that are fundamental to the maturation of any innovation ecosystem. 1 - It is necessary to activate all the agents of the Ecosystem. An ecosystem develops from the contribution of ecosystem agents. Universities, Companies and the Government, together with organized civil society, must contribute from their installed capacities and, in turn, develop new capacities, for the transformation of a territory in its urban, economic and social dimensions. 2 - There is no common future without a shared vision.

There is no collective project without a joint vision of its agents. Being able to involve ecosystem agents to collectively formulate the vision of the ecosystem, will guarantee the co-creation of a project and the commitment to its development. Installed capacities combined with identified opportunities will ensure a strong and long-term vision. 3 - Understand the dimensions of the Metamodel. Ecosystems are complex models, both for their functions and for their governance mechanisms. A collective understanding of the functions of Information, Innovation, Investment, Internationalization, Sectors, Territories, Talent, Society, Local Networks and International Networks with their operational sub-dimensions, will guarantee a full and consistent ecosystem. 4 - Articulation of the Local, Regional and National Ecosystem. The Innovation Environments must be articulated, guaranteeing the local, regional and national articulation of the agents that can intervene in each territory. The local articulation ensures that all agents of the local ecosystem share visions, challenges and projects in a consensual way. The identification of which national and regional agents can intervene with their policies in the local dimension, guarantees the sum of forces for the activation of an Innovative Ecosystem. 5 - Ecosystems as centers of international connection. There are hundreds of Innovative Ecosystems in the world that contribute locally to the development of their territories. One of the dimensions it has to contribute is internationalization. Connecting local Ecosystems and Innovation, transforms ecosystems into international hubs to promote both the internationalization of their markets, as well as the mobility of talent, technology and financing. The formalization of international relations, promoting the Innovation SuperClusters, facilitates and accelerates international growth. 6 - Innovation ecosystems evolve. Innovation ecosystems can be formalized or spontaneous. In both cases, they evolve as their agents develop new functions or encourage other agents to develop them. Knowing what stage an ecosystem is in can help to establish policies and actions from the beginning to growth or maturity. 7 - From Management to Governance. The active participation of agents in an ecosystem requires strategic and operational coordination. Having coordination mechanisms among agents to promote joint projects and assess the progress of projects ensures an articulation of the ecosystem. On the other hand, the management of operational functions requires technical coordination to ensure project management. 8 - Urban, economic, social and environmental impact. An Innovative Ecosystem must serve urban, economic and social development. In the urban dimension, the transformation of the territory is guaranteed, in the economic dimension, the creation and development of both business and occupation, in the social dimension, the well-being and prosperity of citizens is guaranteed. Ecosystems that guarantee a holistic approach will maximize their contributions, ensuring inclusive, smart and sustainable growth.

9 - Intelligent specialized ecosystems. Ecosystems must choose which sectors and technologies they wish to specialize in. The creation of critical mass will facilitate the recognition of Intelligent Specialization. This specialization will require that both knowledge center (universities and Technology Centers) and value creators (companies, entrepreneurs and investors), as well as specialized markets (consumers or innovative public purchases) are aligned in the form of clusters. 10 - Innovation centers as epicenters of innovation ecosystems. Ecosystems can be developed from installed capacities such as Science and / or Technology Parks or by combining the Triple Helix agents. In any case, it is necessary to establish Centers as Epicenters of Ecosystems to implement certain centralized functions (such as Information), or to organize events and activities that facilitate interaction and networking (such as Innovation, Investment or Internationalization).

ORIGINALITY/VALUE: An innovation ecosystem creates the conditions necessary to transform challenges (opportunities and / or problems) into value (economic, social and / or environmental). Ecosystems reach their fullness when ecosystem agents provide the right functions so that talent, technology and financing are a lever for transformation. Understanding the functions that must be developed within an innovation ecosystem are essential to diagnose ecosystems and, in turn, to understand the roles of agents in the construction of the ecosystem. This research presents the set of functions that an innovation ecosystem must develop in order to mature in the performance of its agents (universities, companies, government and organized civil society).

PRACTICAL/SOCIAL IMPLICATIONS: This research aims to provide innovation environment managers, university students, business leaders and public managers with a metamodel of innovation ecosystems that allows it to adapt to existing realities in order to add the capacities installed in the territories and, thus, lead their societies for a future more prosperous.

DIRECTIONS FOR FURTHER RESEARCH/LIMITATIONS: This research presented 10 functions and their sub-functions demonstrating what they are, the reason (why) and cases of inspiration for each one. From then on, local ecosystems can map their functions and sub-functions, identify what is in practice in the territory and establish a strategy to develop those functions that do not exist or need to improve.

KEYWORDS (3-5): Innovation ecosystem; Metamodel; Innovation environments; Innovation.

REFERENCES

Gil, A. C. (2002). *Como elaborar projetos de pesquisa* (Vol. 4, p. 175). São Paulo: Atlas.

Lakatos, E. M., & Marconi, M. D. A. (2010). Fundamentos da metodologia científica. In *Fundamentos da metodologia científica* (pp. 320-320).