

MAPPING THE EXISTING OPERATIONAL LANDSCAPE OF RESEARCH AND INNOVATION HUBS

Silvana BARBURA¹, Monica COSTEI²

Rezumat. *Promovarea și susținerea unui mediu de afaceri controlat se poate realiza prin înființarea și stimularea HUB-urilor de cercetare, de inovare și de industrializare. La ora actuală, HUB-urile conduc la o Europă mai competitivă și mai inteligentă, prin promovarea unei transformări economice inovatoare și inteligente, la dezvoltarea și îmbunătățirea capacităților de cercetare și inovare și adoptarea de tehnologii avansate. Hub – ul fiind astfel un mediu controlat, reprezintă un business de comunitate al cărui succes este consecința directă a succesului rezidenților acestuia, prin accesul acestora la oportunități pentru creșterea accelerată a business –ului propriu. Una dintre modalitățile de succes și de accelerare a afacerilor care oferă oportunități rezidenților unui Hub îl reprezintă programele antreprenoriale de incubare. Contextul operațional de funcționare al acestora conduce la stimularea existentă a mediului de afaceri cât și la creșterea și eficientizarea mediului economic într-o regiune țintită, în funcție de resursele și nevoile societății din respectiva regiune.*

Abstract. *Promoting and enabling a controlled business environment may be achieved by setting up and stimulating research, innovation and industrialization Hubs. Nowadays the HUBs are leading to a more competitive and smarter Europe by promoting innovative and intelligent economic transformation, to the development and improvement of research and innovation capabilities research and innovation and the adoption of advanced technologies. A Hub being thus a controlled environment, it represents a community business whose success is linked as a consequence of the success of its residents, by their access to opportunities for accelerated growth of their own business. One of the ways to succeed and accelerate businesses that provide opportunities for the residents of a Hub is through entrepreneurial incubation programs. Their operational context leads to the existing stimulation of the business environment and to the growth and efficiency of the economic landscape in a targeted region, depending on the resources and needs of the society that specific region.*

Keywords: Innovation, Entrepreneurship, Technology, Digitalization, Accelerators

1. Introduction

Owing to the current trend of technological and innovation transformation of the entrepreneurial environment, of the economic, social and culture, environmental and health arias, of the implementation of eco-systems on cities,

¹ MBA, Data Protection Officer, SC INCERTRANS SA Bucharest, Calea Griviței 391-393, Sector 1, gdp1@incertrans.ro

² Eng., Head of Technical Assessment department, SC INCERTRANS SA Bucharest, Calea Griviței 391-393, Sector 1, monica.marinca@incertrans.ro

the territories and their mobility, at present the research hubs can be classified as follows -

1. Hubs Research pertaining to climate, environment and energy – through which opportunities are created for education and research about climate, environment and energy by means of an inter-and trans - disciplinary manner, necessary for scientists to meet the challenges of the current Anthropocene era, including the climate crisis and, implicitly, the ecological one.
2. Hubs Research on society environment, culture and heritage, these acting mainly in academic collaboration spaces where the focus is on research-oriented activities whose results can be later used within economic and entrepreneurial environment. These research Hubs in fact are challenging the support of environment societies that are constantly facing the change and multiple crises, as such the research activities are in the stage to try to promote the critical reflection on the historical and theoretical basis of the different forms of coexistence, as to explore the phenomenon of migration, cultural diversity and identity, community building, multilingualism, as well as, cultural participation and different forms of inheritance, as well as responsibility towards nations. The research activities are based on innovative and interdisciplinary methods, by supporting the drivers of transnational and multidisciplinary culture.
3. Hubs Research acting within the field of Health, with a strong predominance at present, the major concern of the world is acting within the field of health, research and innovation of effective medical methods, research and discovery of innovative medical treatments that lead in particular to the prevention and overcoming of diseases, especially in the field of Oncology, Biochemistry and Genetics, as such that the Health Research Hubs play a major role in deepening and development of medical sciences that have a major impact on world society, the evolution of mankind and the health of world society.
4. Hubs Research on municipalities, cities, territories and mobillities that address the challenges and opportunities related to urbanization and mobility, environmental issues and society transformation, of socio-economic and health inequality viewed from the spatial perspective. It has been proven that these problems have significant implications not only in Europe but also globally, and accordingly the main focus is represented by research and innovation in areas such as urban planning, transport engineering, environmental science, sociology, economy, architecture, public health, political science, history and gender studies.

In particular, a translocal and system-wide understanding of urban and spatial development, mobility and transport, is pursued, of ecological socio – sustainability from a global perspective leading to the development and sustainability of innovative solutions regarding urban, territorial and mobility

environment, by creating cities, territories and sustainable and inclusive territories and mobility. These can significantly contribute to improving the levers of justice, increasing social and environmental welfare, economic growth through alternative and sustainable innovative methods, aiming at more viable cities.

5. And last but not least, Hubs Research fields on Digital and Technological Transformation, which represent the central poll of the research and innovation directions in order to have a significant impact of the global environment society, health, urban environment, economic growth, support for the private entrepreneurial environment, stimulation of public - private partnerships in order to attract public funds.

The digital and technological transformations are currently the central feature of contemporary social processes and are unfolding at an unprecedented speed, at a time when both Europe and the world are facing critical challenges, as such these play an important role in identifying innovative solutions in the definition process in which the society relates to these situations.

At the same time, these have the role of producing educational and coherent flows that explore the implementation and deepening of the understanding the digital technologies in the areas that affect the social life – work, education, trade, governance, health.

2. Content

At present the Hubs, be these local, academic or regional, are created with the both mission of providing national support and being the main connector with international initiatives regarding what is called – open science – free access to scientific results, whether these are financed from public and/or private funds, support research and innovation communities, and, contributing to the national agenda towards an open system of research results and contributing to open science the European Union by

- a. Creating and maintaining national dialogue platforms to disseminate relevant information and to discuss the needs of the scientific community, decision makers and other categories of actors interested in open science
 - b. Developing various portals as unique points to resources and news within the field of open science for communities in Romania/Europe and interconnecting with other relevant platforms
 - c. Coordinates of the elaboration processes of the National Open Science strategies and of the action plans for their implementation.
 - d. Managing projects in the field of science and innovation based on data disseminated without restrictions
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- e. Facilitating the opening and alignment to European policies and initiatives by engaging in various networking and collaborations with international organizations.

Noteworthy in the Romanian collaboration on the development of – open science – in the research and innovation system of Hubs research in Romania are organizations such as Science Europe, CoNOSC, CoNOSC, The European Open Science Cloud Association, RDA – Research Data Alliance, etc., which main purpose is to identify and define practical solutions, guidelines and architectures for supporting research communities, of projects supporting the reform of research evaluation towards systems that stimulate and adopt open science practices and the creation of a common framework for research activity.

In this regard, a major focus of research activities on the Hubs guidelines are represented by the supporting national activities that may contribute to the development of the European Cloud for the open science, as whose main scope is to make a substantial contribution to the European Open Science Cloud, as per opening the service portfolio to ensure the European opening of science at a global level.

The establishment of such a Hub meets the pressing needs of society in a dynamic society that is in constantly changing evolutions, being dedicated to frequent updates and developments at European and Global level, both at the level of alignment and policies, and at the level of alignment of the bottom – up initiatives that are directly influencing the development of the Open Science ecosystem.

Within the above description context, the Research Hubs are currently aiming for research, development and implementation of innovative solutions demonstrated to be viable to be implemented and afterwards to be taken over by the entrepreneurial environment and disseminated within the economic environment.

The effective operational context of the Hubs as such the results of the research activities to lead to local and/or regional and/or national success in the economic environment, is represented by the way these results may be accelerated.

One of these ways of accelerating the activities within a Hub is the establishment of business incubators. Hubs often are associated with various entrepreneurial incubation programs to provide opportunities for their residents. Some Hubs are creating incubation programs themselves that are lasting from several weeks to several months per year.

Thus, the main question here relies on - *How can a business incubator be defined within a Hub and related direct consequence on a local and/or regional community and/or National for the purpose of economic development from the perspective of the respective local/regional territory.*

The Answer is -

Identification of measures and support of business support structures and collaboration with local and/or regional resort authorities for the establishment of Business Centers – Business Hubs , incubators and business accelerators – Business Incubators and Accelerators -, Digital Innovation Centers – Digital Innovation Hubs – DIH, Individual Investor Networks, like Business Angels Networks - BAN, Participatory financing platforms, like Crowdfunding Online Platforms, clusters, industrial parks, science and technology/software, as well as research centers or institutes and development innovation.

The main three components that are conclusive for the success of a Business Hub and that are direct correlated are –

- Entrepreneurship
- Responsibility
- Creativity

A business incubator within a Hub determine this to become a controlled business environment where the residents have access to opportunities for accelerated growth of their business, both vertically and horizontally. When we refer to vertical, we refer primarily to the quality of the products that the freelancer/entrepreneur delivers, and horizontally, we refer to the increase in the number of employees of the start – up/company.

Actually, the establishment of a Hub is a fairly complex exercise, defined in three stages.

The first step is to engage a community of people interested in these types of services. This step can take between one and two years and at this stage it is very important to understand very clearly the needs of the people in a respective community and to grow the community according to their expectations.

The second step is to identify an appropriate environment that can last between six months and a year. There are some special requirements for the space intended for a Hub, requirements that can make the difference between success and failure, accordingly it is necessary to determine, in a relevant proportion, the chances of success of a space.

The third step is the permanent coordination of this community, since the success of a Hub is the direct consequence of the success of their residents.

In other words, a Hub is actually a community business, where success is a direct consequence of the success of their residents.

The general objective of such a project can be achieved by the following and developing the three components – Entrepreneurship, Responsibility and Creativity, and, by developing the entrepreneurial skills of a certain number of start-up companies or SME, who want to develop an independent activity and

also, another step to accelerate their business is to support and/or, depending on the case, assisting them with business plans to increase the employment. An important criteria is the target group scoped by entrepreneurs and the pursuit of meeting the pre-established indicators.

The main goal is the interactions between the following four pillars that can ensure sustainable development

- Start – up – with emphasis on innovation start-ups
- Open innovation
- Entrepreneurship and entrepreneurial culture
- The favourable economic context for the development of an ecosystem of start-ups

The Start – ups, whether innovative or not, are a form of bottom-up development and are an element of sustainable development, and the culture of entrepreneurship that accompanies them is a significant value for each state. Entering into an economic and productive system of new entrepreneurs, new ideas and new concepts are in fact a driver for product and business process innovation and stimulates interaction between people, ideas and capital that enable the development and creation of new jobs and the possibility of creating new businesses.

Initiating and disseminating initiatives designed to encourage and facilitate the creation and development of new entrepreneurial activities represents a growing trend in the economy of many states, and lately, in recent years this trend has also manifested in Romania.

In this respect, we can provide a common element of the states of the European Union. Both in Romania and in Italy, and in other EU countries, an aid a significant support within activities oriented to the proliferation of start – ups is represented by the financial support that almost all structural funds programs offer to start and support start-up – uri (in particular the European Social Fund and the European Regional Development Fund).

In some economic contexts, the start ecosystem – ups seems to develop in a natural way, within a symbiosis of processes and relationships that interrelate without any friction, the only element that we can say would represent a healthy disturbance of this harmony being the competition.

The comparative example, namely the Silicon Valley Model is not so simple example to take over and develop it in any socio context – economic – territorial. Much more effective is the stimulation of the commitment of individual actors present in a certain socio context – economic – territorial. **THUS, AT THIS POINT, THE NEW ACTOR'S RESPONSIBILITY BEGAN TO BE DEFINED, NAMELY THE BUSINESS INCUBATOR.**

It is obvious the need for a continuous effort from stakeholders such as the state, local administrations, universities and research centers, as well, companies already existing and consolidated on the market to contribute and facilitate the creation of new businesses and their further development.

Accordingly, the specific task of a business incubator lies in identifying a series of relationships and tools capable of improving the processes specific to a new company that are helping the entrepreneur to face and overcome the difficulties characteristic to the initial phases of a new process of creating a start – up.

The concept of BUSINESS INCUBATOR is used to identify various programs or initiatives, promoted by private or public bodies, whose purpose is to encourage and support the development of new forms of business. In general, these structures offer strategic consulting services, physical spaces, equipment and logistic structures, dedicated training and financing. These activities are intended to support the growth and competitive consolidation of existing start-ups within them, as well as to convey an entrepreneurial vision to those who are preparing to launch their own economic initiative (Gerlach and Brem, 2015). At the opposite end, the concept of start – up refers to the initial phase that characterizes the start of a new economic activity. In the current context, the business incubator has become attractive and widely accepted as a means to increase the chances of survival for new business projects.

Entrepreneurship is at the heart of sustainable economic growth for both developed and developing economies, and business incubators often served as catalysts and even accelerators for the formation and development of entrepreneurial clusters.

We definitely may say that business incubators are entities that belong to the wider range of initiatives that aim to stimulate and support entrepreneurship and that try to combine technology, capital, and, professionalism and entrepreneurial experience to accelerate the birth and development of new businesses (Grimaldi and Grandi, 2005).

We can associate the success of a business incubator with its goals and the success of incubated companies after leaving the incubation program, as well as the importance of creating a reputation over time that positively influences the perception of the success of the incubator.

Regarding the establishment and development of business incubators in Romania, most of them are located in Bucharest Region – Ilfov, Centre Region and West Region. Following an analysis of business incubators, the following aspects are revealed -

- ❖ The services provided by the business incubators are consulting services, office space rental, security and protection services, training, access to utilities (electricity, thermal energy, water & gas), telecommunications services (phone, email, high-speed internet), administrative services.
 - ❖ The business incubator administrator is the one who manages the incubator and is chosen following an evaluation, taking into account a series of criteria established by a specialized commission.
 - ❖ The Administrator is either a commercial company or a non-governmental organization. Among the duties of the administrator can be found – the administration of the technology and business incubator – providing the necessary staff for the provision of services – developing investment attracting activities – capitalizing on facilities related to the benefit of incubators (residents) – conclusion of contracts for the provision of services with residents of the incubator.
 - ❖ A good Administrator must possess qualities such as entrepreneurial ability, undertaking the risks, responsibility, perseverance and teamwork.
 - ❖ During an entrepreneurial training course, the potential residents actually work on developing their own business ideas and developing their business plan and they are following the training program carried out online or in a course space. The business plans thus developed have the chance to enter a compete of project ideas. An important aspect is the transparency of their selection in relation to regional strategies and in accordance with the sectors identified as competitive, as such that, in a competition of business plans may participate future or current entrepreneurs who do not participate in a training program but that are part of the eligible and visibly transparent target group category.
 - ❖ Another major advantage is the fact that the winners in these projects benefit from the support services within a business development through counselling and entrepreneurial consulting activities trained by means of Centers and Hub – business hubs. The primary role of the Administrator of a Business Hub will be to target the project through an integrated approach, which is based on the following complementary components, namely, Entrepreneurship, Responsibility and Creativity and to support the development plan, training of future entrepreneurs, encouraging entrepreneurship through support services in developing a consistent business plan and financial assistance, advice and monitoring for establishment and development, as well as for sustainability. The Administrator will aim to contribute to the development of the economy at national, regional and local level by developing a competitive business environment and stimulating employment, including final year graduate students and tertiary education graduates.
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A Business Incubator worthy to mention and unique in terms of technology development, located in South West region of Romania is represented by the Pitesti BUSINESS INCUBATOR developed right within a Business Hub named BUSINESS HUB PROSANT, established in order to promote entrepreneurship by supporting research activities – development.

This Incubator is an extremely ambitious and complex project, consisting of the existence of a Business Hub and Research that holds all the awards to become one of the pillars of Europe and not only, but within the field of research and technological transfer. The project represents the successful collaboration of a partnership between INCERTRANS S. A. – Administrator of the Business Incubator and of the City Hall of Pitesti - UAT Pitesti Institution as Partner Leader.

The Business Incubator in Pitesti is an opportunity for residents to benefit from support for business development through access to services specific to the pre-incubation stages represented by the assessment of the potential of the business idea, and, excellent consultancy on the business model, then incubation, through administrative services, networking, access to the research laboratory and mentoring and then post – incubation, by identifying national and international funding calls and support in submitting applications.

Within the Business Incubator located in Pitesti, the selected companies are hosted for a fixed period of time (named the incubation cycle), a time interval in which they benefit from financial support, as well as, consulting services and office space. A unique advantage of this incubator is the fact that besides the logistical support necessary to start activities, the Incubator offers a favorable environment for business development, by facilitating networking activities, transfer of know – how and by providing assistance and support in developing partnerships. Residents also have the opportunity to participate in trainings, seminars and conferences, to receive assistance in the achievement of business strategies, support in writing projects necessary to attract funding or other relevant areas.

All these above mentioned have the role of supporting the development of companies, as such these may reach a level of stability and autonomy that will allow them to exit within the Incubator and operate on their own, with increased chances to face the competitive environment and survive in for a long run.

Another section on the demonstrated need of Hubs for economic development and entrepreneurial business environment are represented by Hubs that lead to an accelerated growth of the economic environment and necessary automatic transformation and stringent of society environment in general and through which the society environment is forced to align to the fast pace of technological

transformations and digitalization, respectively the Centers/the Hubs regarding Digital Innovation. The Romanian Competent States authorities are working intensively to align the policies established in Europe in the current context of the speed of rapid transformation of environmental society, with significant impact on the health sector, of the medical sciences – health science environment, climate, energy, oil and gas, socio-cultural life, production, manufacturing and implicitly of the economic and commercial environment.

In this context, the Digital Innovation Centers in Romania and the followings that will be established are consistently establishing the concept of Digital Innovation Hubs of the European Commission by adopting the Strategic Framework for the implementation and use of innovative technologies foreseen for the period 2021-2027 on digital solutions for streamlining activities.

The Digital Innovation Centers, hereinafter referred to as CID, are stand-alone organizations, coordinated by organizations that have complementary expertise and that support SMEs and mid-level companies, but also the public sector, for the digital transformation process.

The main functionalities that CIDs need to meet are -

1. Networking and ecosystem building – a system of awareness, involvement and creation of synergies on digital innovation opportunities for relevant actors,
2. Test Before Testing – services to identify digitalization opportunities, as well as validation of innovative solutions using cutting-edge technologies
3. Skills and training – a contribution to strengthening innovation capacities by developing technical, digital, business, financial and management knowledge and skills
4. Support to find investment – which is reflected by supporting enterprises and public administrations to identify sources of financing, including, application and use of digital solutions and evaluation of the effects of digital transformation.

Accordingly, the Center of Digital Technologies have a major role in the Digital Europe Program (Digital Europe Programme) which aims to stimulate the adoption of AI technologies – Artificial Intelligence -, HPC – High Performance Computing – and cybersecurity, and also digital technologies developed by the industry sector (production/manufacturing – production, manufacturing), manufacturing, through SMEs and medium-sized companies or – midcaps, as well as by the public sector in Europe. They must provide innovation services such as access to finance, skills training and capacity at the level of Beneficiaries that are necessary in the digital transformation process.

The main areas of expertise and services are closely related to the four previously described functionalities that are having the scope of -

- a. Strengthening and expanding regional innovation ecosystems, evaluation of the degree of digital maturity and access to innovation capabilities and infrastructure in order to validate the concepts, meaning POC Proof of Concept – rapid prototyping – Prototype – or testing of products and services, training the skills needed for an efficient digital transformation,
- b. A key issue will be environmental issues, in particular energy consumption and low carbon emissions.

The commercial and economic aspect lies in the fact that the Hubs regarding the Digital Innovation are defined as – onestop shops – which help companies to become more competitive through digital technologies in terms of look at production and business processes, as well as their products or services. Deriving as a concept from the competence centers, the Digital Innovation Hubs also gather the collaborative and multi-sectoral perspective, substantiating both their structure and their activity.

The digital transformation of the economy is the key element in Europe's strategies and programmes to remain competitive internationally. This is achieved by integrating digital technologies into business processes, products and services of private companies and the public sector in order to achieve efficiency, digital innovation and environmental sustainability by reducing greenhouse gas emissions. Moving to a data-driven economy can be a key element to drive economic growth, creating new jobs and defining new business models that better respond to innovation opportunities.

Accordingly, the convergence with climate neutrality goals requires advanced technologies in various fields, and digital technologies can become key tools for improving efficiency in all aspects of our lives.

During the 2021– 2027 budget exercise, the European Commission has outlined another significant role for the Centers of Digital Hubs, and their evolution in the Digital Europe programme, where the European Digital Innovation Centers (EDIHs) represent the main lever of acceleration and performance in the digitization of public authorities and Small Medium Enterprises.

The European Digital Innovation Centers (EDIH) is an unique lever that support companies and public sector organisations to meet digital challenges and become more competitive. The portal image of European Digital Innovation Hubs Network is presented in the Figure 1.



Fig. 1 Image of the portal European Digital Innovation Center.

<https://european-digital-innovation-hubs.ec.europa.eu/home>

Just like the CDIs, the EDIHs supports companies to improve business/production processes, products or services that use digital technologies through –

- a. Providing access to technical expertise and testing, as well as the possibility to test before investing.
- b. Provision of innovation services such as financial advice, training and skills development, which are essential for successful digital transformation,
- c. Supporting companies in addressing environmental issues, in particular the use of digital technologies for sustainability and circularity.

EDIH combines the benefits of a regional presence related to the opportunities available for a pan-European network. This regional presence leaves them well placed to provide the services that local companies need, through the local ecosystem of language and innovation.

European network coverage thus facilitates the exchange of best practices between centres in different countries, as well as the provision of specialised services in all regions when the necessary skills are not available locally.

3. Conclusions

We mention that the purpose of our research was to demonstrate the existence of human scientific potential, to highlight the legislative aspects of functioning and the existence of business incubators, innovative and technological ones. These are in fact fundamental tools through which additional knowledge are obtained regarding the management of the entrepreneurial activity, the foundations of information technologies for business, business management, evaluation of entrepreneurial activity, marketing, financial resources for Small & Medium

enterprises–, fiscal and accounting records, communication and negotiation techniques, cyber security for the company.

Following the principles of impact and sustainability and trying to collect as much data as possible in the investigated areas, respectively, Research Hubs, and, Digitalization and Technology Transfer Hubs and Business and Innovative Incubators, this paper highlighted the indicators that express the potential of impact and sustainable development, by analyzing the performance of incubators.

This research consists the need to be able to represent a unitary value that clarifies the functioning, vision and the tilt of the incubator into to the economic system, to the Logic of Start – Up, towards open innovation strategies realized within the Hub – research and towards the life cycle and start needs – up.

The research provides a unitary value for each of these macro – areas of operation of an incubator, but at the same time, highlights the sub-elements in which the incubator should improve to determine a high impact and sustainable development.

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