Classification of Business Incubators

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ABSTRACT

In the world of monopolization and globalization of the market, the role of small businesses and their innovation potential in bringing new solutions to the market faster, cheaper, and with more added value is becoming increasingly important. It is exactly the promotion of innovation that has become the cornerstone of economic transformation. Given the high barrier to entry, the role of different forms of business support has increased significantly. These changes and rapid growth have influenced the development of business incubation, which has led to the development of various support mechanisms, such as co-working spaces, accelerators, early-stage investment funds, etc.

In response to the market demand, there has been exponential growth in the number of business incubators with the aim of exponentially increasing their value and impact on the economy, while the value of business incubators is exponentially decreasing due to uncertain evaluation of their impact. In this regard, it is essential to classify business incubators reflecting on their different operating models, purpose and performance metrics, and their potential impact on the economy or other systems.

Keywords: Business incubator, acceleration, entrepreneurship, innovation

1. INTRODUCTION

The first business incubator was established in 1959. Transferring the experience from poultry farming to entrepreneurship, the concept of business incubators quickly evolved from a real estate service to an important tool for promoting economic growth. Over the past 65 years, the number of business incubators has increased more than 500-fold and is still growing. During this period, there have been several economic crises at local, regional, and global scales, as well as breakthroughs and transformations influenced by the waves of technological development. The development of the concept of business incubators has led to the assumption that they play a crucial role in the development of local, regional, and national economies, while at the same time, the survival rate of start-ups after 3 years since establishment still remains in the range of 2-5%. The supply of innovation to the market is increasing rapidly, while the total investment is decreasing. In order to keep track of the conditions for economic development and their impact on the design and performance of a business incubator, it is necessary to classify the types of business incubators, thus broadening the range of indicators that can be attributed to their performance and their overall impact on the economy.

Subject of the study: development of the concept of a business incubator, types of business incubators, and their mapping.
Scientific aims of the research: 1. to identify the types of business incubators and systematize them; 2. to analyze the differences between a business incubator and an accelerator; 3. to develop a taxonomy of business incubators.
Conclusions: the concept of business incubators has evolved in different areas, expanding their role in economic and social development
Findings: Having analyzed the concept of a business incubator, a model of the business incubator taxonomy has been developed, which adopts a holistic approach, it includes ten categories and their breakdown
Period of the research: year 2021.

2. METHODOLOGY OF THE RESEARCH

To achieve the aim of the paper theoretical research and empiric research was conducted. Several research methods were used:
1. theoretical literature review and overview;
2. qualitative content analysis.

The analysis of theoretical literature was carried out with the aim to study the evolution of the concept of a business incubator and to determine the categories and types of business incubators identified in the studies. After the literature review, qualitative content analysis and a systematic review of the types of business incubators were conducted. The categories and types of business incubators were identified.

3. THEORETICAL BACKGROUND

The first business incubator was founded by Joseph Mancuso in Batavia, New York, in 1959 on the premises of Massey - Ferguson (Lewis, 2002, Leblebici and Shah, 2004) [18]. After a large poultry company moved out, a real estate agency had to ensure continued use and utilization of its building with a total floor area of 850,000 m2 (Adkins, 2001, Sean M. Hackett, David M. Dilts, 2004) [1]. As no one showed any interest in using the whole building, it was used to house various smaller companies which asked for additional support in business development and attraction of investment (Adkins, 2001, Sean M. Hackett, David M. Dilts, 2004) [1]. Combining these needs with the historic use of the building, a support mechanism called a business incubator was created (NBIA, 1990). [2]

Incubator as a name was used to denote “the process or event of incubating something in a controlled environment” (OED, 1993) [4] and it was exactly what the previous occupant of the building did – ensured the development of the chicken embryos in the eggs. Transferring this experience to entrepreneurship and adopting similarities, incubation was seen as a unique and

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flexible combination of organized business development processes that enable the creation of new and small businesses, providing critical support to help them survive and grow at the early stage of their development (Sarfraz Mian, 2016). [3]

Other important contributions include the establishment of the first science park in California in 1951, creation of the University City Science Center in Philadelphia in 1964, which brought together 28 US colleges and universities to streamline the process of commercializing fundamental research results (Adkins, 2001, Sarfraz Mian, 2016), and the contribution of the MIT researcher Birch in 1979 and elsewhere (Kirchhoff, 1994) [25].

Starting with the 1970s, business incubators proliferated around the world (Albert and Gaynor, 2003) [19], and their number has grown more than 500 times in the last 50 years. This was facilitated by the program of the National Science Foundation – Innovation Corps, which stimulated and institutionalized best practices for the evaluation and commercialization of the selected technological inventions (Bowman-Upton et al., 1989; Scheirer, 1985, Sean M. Hackett, David M. Dilts, 2004) [1].

In the 1980s, the concept of business incubators developed in cooperation between higher education and scientific institutions. In the 1980s and 1990s, the number of incubators in the US was rapidly and significantly growing when (a) the passage of the Bayh-Dole Act by the US Congress in 1980 reduced the uncertainty associated with the commercialization of federally supported basic research, (b) the US system increasingly recognized the importance of innovation and intellectual property protection, and (c) the profit opportunities arising from the commercialization of biomedical research expanded. (Sean M. Hackett, David M. Dilts, 2004) [1], a systematic review of business incubation research, influenced the development of the concept of business incubators in the 1980s in collaboration between higher education and scientific institutions also elsewhere in the world.

In the 1990s, business incubators developed in technology parks and clusters in such fields as biotechnology, information technology, and environmental sciences. [4]

Along with the development of the concept of a business incubator, business incubators (BIs) were assumed to play a crucial role in the local, regional, and national economic development through job creation and profit generation (Aernoudt, 2004; Aerts, Matthyssens & Vandenbempt, 2007; Grimaldi & Grandi, 2005) [11], technology development, and innovation (Cooper & Park, 2008; Lee & Osteryoung, 2004; Phan, Siegel & Wright, 2005; Swierczek, 1992; Tsai et al, 2009) [20]. BI is one of the newest organizational and economic models that are established, often through economic development agencies, to support and accelerate the development of businesses to achieve economic development goals (Marlow & McAdam, 2011; Peña, 2004; Rice, 2002; Scillitoe & Chakrabarti, 2010; Sofouli & Vonortas, 2007) [5].

The development of business incubators can be divided into three phases:

(1) Before 1980: development of the concept of a business incubator, which mainly focused on economic restructuring and job creation, essentially provided affordable working space and shared services (Mian, 2011).

(2) 1980-1990: A number of new incubation facilities were developed in the US and Europe, offering a wider range of services, including advice, skills development, and networking opportunities. According to the National Business Incubator Association (NBIA) (2012), the growth of the incubation sector during this period was driven by the following public and private sector activities:

- In the mid-1980s, the US Small Business Administration promoted the development of incubators through a series of regional conferences and several publications to spread information about incubation.
- In 1982, the State of Pennsylvania created the Ben Franklin Technology Development Authority, which included incubators as a key component and pioneered state support for business incubation.
- A large private technology firm, Data Control Cooperative, launched the Urban Enterprise Initiative, which established business incubators in many US cities.

(3) From 1990 onwards, the development of the world wide web and the expansion of its use led to the development of the virtual business incubator model, which helped ensure convergence of support for ensuring the growth potential of specialized businesses, such as ICT start-ups.

Business incubators started operating in Europe in 1980, developing rapidly first in Central and Western Europe and then in Eastern Europe in the 2000s. In Germany, the development of business incubators started in the late 1970s and early 1980s and spread further to Austria (Todtling and Todtling 1990, Sternberg et al 1996, Galley 1997, Gozali et al., 2015) [6] and the UK (Monck et al. 1988, Massey et al. 1992, Westhead and Storey 1994, Gozali et al., 2015) [6], and the Netherlands. Their activities were mainly focused on the provision of shared premises, i.e., offering unused buildings to small businesses, as well as additional 'workspace' services (cleaning, registered address, postal services, etc.).

4. BUSINESS INCUBATOR DEVELOPMENT

Today, there is a wide network of incubators in Europe that adopt different approaches, work in different areas, and offer different support models. The European Business and Innovation Centre Network (EBN) was founded in 1984; it brings together a network of more than 120 Business Innovation Centers (BICs). A 1995 survey of 83 BICs showed that 78% of them offered incubation support, mainly for technology-based start-ups (EBN, 1996). [4]

Business incubation was seen as a way to ensure the development of small and medium-sized enterprises, which is an essential prerequisite for the recovery from various economic recessions.

Since the establishment of the first business incubator, most incubators have been established as publicly funded organizations for job creation, urban economic revitalization, and commercialization of university innovations, or as privately funded organizations providing incubation for high-potential companies (Campbell and Allen, 1987, Sean M. Hackett, David M. Dilts, 2004). [1]

Given that business incubators are dependent on government support, their performance indicators have to match the policy settings of the time and the established return on investment indicators, thus encouraging business incubators to report only on the acknowledged successes and achievements of the time, but not on the actual performance (Sean M. Hackett, David M. Dilts, 2004). [1]

About 90% of business incubators receive state, regional, or industry funding in cooperation with the education sector. Business incubators have a lifespan of 5-7 years, which is linked

to the implementation of long-term financing programs. Maintenance and provision of the premises and associated infrastructure are among the reasons for the high costs incurred by business incubators.

According to the European Commission statistics, small and medium-sized enterprises (SMEs) are the backbone of the European economy, representing 99% of all businesses in the EU. Over the last five years (2012-2017), they have created around 85% of new jobs and accounted for two-thirds of the total private sector employment in the European Union (EU). The European Commission sees SMEs and entrepreneurship as the key to economic growth, innovation, job creation, and social integration in the EU.

A study published by the European Business and Innovation Centre Network (EBN) demonstrates that SMEs that have received incubation support are significantly less likely to fail in the first few years after establishment. The overall three-year survival rate for start-ups is around 56%, while for those helped by business incubators, it is around 90%.

In a world of monopolization and globalization of the market, the role of small businesses and their innovation potential in bringing new solutions to the market faster, cheaper, and with more added value is becoming increasingly important. Given the high barrier to entry, the role of various forms of support, such as business incubators, accelerators, investment funds, co-working spaces, etc. has increased significantly.

The original business incubator model was based on offering lower rental prices for market-value business premises additionally providing shared space. To date, not only has the number of business incubators grown, but the operating model, value proposition, and role in economic recovery and growth have changed dramatically.

In 1992, the number of business incubators worldwide reached more than 2,000 (OECD, 1992), [4] and their number has continued to grow and spread rapidly in Europe and elsewhere. Given that business incubators have their origins in the USA, according to the National Business Incubator Association, there were 13 in the 1980s, but by the 1990s, the number had reached 600 and 550 in Canada (NBIA, 1996). [2]

In response to market demand, there has been an exponential growth in the number of business incubators with the aim of exponentially increasing their value and impact on the economy, while their value is exponentially decreasing due to uncertain assessment of their impact.

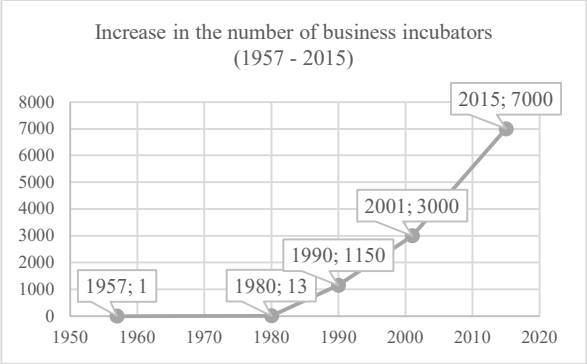

Figure 1, Growth in the number of business incubators by year (developed by the authors)

The last available data on the number of business incubators in the world was published by the European Commission in 2001, assuming that there were around 3,000 business incubators worldwide, while in 2015 the International Business Innovation Association (InBIA) reported that there were around 7,000 business incubators worldwide and 1/3 of them were technology-oriented (InBIA, 2015) (see Figure 1).

Business incubators have been growing substantially since 1990. Comparing the increase in the number of business incubators with the time curve of technological development and productivity (innovation index), information technology, their accessibility, and related innovations played an important role in changing market behavior and further development.

In 1990, with the advent of the World Wide Web, there was an evolutionary change in the way information was circulated and accessed, in the development and access of the global market, in international cooperation, logistics, and other sectors. It was these changes that led to the rapid development of innovations and new technologies, which at the same time created an equivalent market demand for business support instruments and models, including business incubators, which by this point had been in operation for almost 40 years.

Given that the further development of the business incubator network was closely linked to the development of the IT sector, it is important to mention its next turning point, which was observed from the 2000s onwards, with the rapid development of mass consumer-oriented technologies. Given the need of the IT industry, a fast-growing sector, to provide accelerated product development, testing, and deployment, there was a market demand for a new form of business support, adapted in operational principles to the specific needs of the sector – accelerators.

To forecast the number of business incubators in the world, information from 49 business incubator associations worldwide, as well as the datasets of the National Business Incubator Association (NBIA) with 2200 members, the International Business Innovation Association (InBIA) with 1200 members, and the International University Business Incubator Association (UBI Global) with 1200 members, were collected and analyzed.

Precise statistics on the number of business incubators are not available due to the use of different labels, different national approaches to collecting these data, and the activities of associations aimed at expanding the network.

The data obtained were compared with the population of a country to determine the ratio, i.e., the number of business incubators per 1 million inhabitants.

Table 2
Ratio of business incubators to 1 million population (2020) (developed by the authors)

Country	Number of business incubators	Population	Ratio to 1 million
USA	523	325.7 mil	1.61
Armenia	1	2.92 mil	0.34
China	7500	1.379 bn	5.44
Australia	33	24.13 mil	1.37
Austria	24	8.74 mil	2.75
Russia	150	144.5 mil	0.963
South Africa	58	57.78 mil	0.97
Latvia	21	1.96 mil	10.71

On average, there are 1-3 business incubators per 1 million inhabitants. The number depends on various factors influencing the national situation:

- geopolitical indicators;
- economic indicators;
- public opinion indicators.

Assuming that the world population currently amounts to 7.8 billion, the number of business incubators could be between 7,810 and 24,430, which is double the number since 2002, when there were 3,000 incubators per 6.3 billion people or 0.5 incubators per 1 million people.

The digital economy that brought rapid technological development and changes in market speed has given rise to a new form of business incubation mechanism – the accelerator.

5. ANALYSIS OF THE DIFFERENCES BETWEEN A BUSINESS INCUBATOR AND AN ACCELERATOR

The accelerator is considered a new and emerging incubation mechanism. Accelerators are considered to address the main challenge facing traditional incubators – "ensuring the sustainability of young entrepreneurs". Accelerators would provide a wide range of mentoring services, networking opportunities, and access to finance. As Pauwels et al. (2016) point out, the real challenge is to understand the characteristics and profiles and how they can benefit individual entrepreneurs and their start-ups. [7]

An accelerator is a new model of incubation that ensures the sustainable development of the participants in the short term. (Sarfraz Mian 2016) [8]

Hochberg (2015) described accelerators as a technology business incubator for a fixed, short-term period that provides start-up founders with an education and mentoring program. In addition, accelerators offer investable solutions and teams to business angels, private investors, investment funds, and CEOs. Accelerator members receive a set of services that would be too expensive or unavailable for individual teams. In the end, participants are prepared to deliver a presentation to attract investment and attend the closing event where they have the opportunity to attract potential investors. (Hochberg, 2015) Accelerators are often funded using a combination of public and private funding. (Cohen and Hochberg, 2014). [7]

The first accelerators were established in the early 21st century in the USA (Y Combinator, which started in Cambridge, Massachusetts, in 2005 and later moved to Silicon Valley). The accelerators were primarily focused on supporting and investing in the development of high-growth, IT-based products. Over the last 15 years, accelerators have provided IT-based product manufacturers with access to the private investment market, education, industry, and a network of professionals.

By 2013, more than 213 accelerators were reported worldwide, supporting around 3,800 new ventures (NESTA 2011, 2015). [9] Considering the market overview, a new global trend has been observed over the last five years: accelerator programs are starting to experiment with different specifications, such as healthcare (Techstars Healthcare Accelerator, in partnership with Cedars-Sinai, established in 2015, Los Angeles, California) or IoT (Techstars IoT, established in 2016, New York, USA), equipment (HAX Accelerator, established in 2015, Shenzhen, China). When the accelerator program was launched, the operational model was based on public policies of the period (where state support instruments were involved), the interests of private and corporate investors, or the stance of individual market players. The attitudes dominating in a particular region, economic data, and processes were generally not taken into account in the design of the accelerator programs.

Given the rapid development of accelerators and the growth in the number of business incubators, the question of whether there are differences between these operating models, whether they are complementary, competing, or sequential support mechanisms has come to the fore. A review of the number of business incubators showed that in many countries around the world, a business incubator is called an accelerator and vice versa.

Accelerators are time-bound programs, which include mentoring and educational components and finish with a demonstration day. While traditional business incubators are often publicly funded, accelerators run support programs using their own funds, they focus on biotechnology, financial technology (FinTech), medical technology (MedTech), cleantech, or product-oriented companies.

In contrast to business incubators, accelerators operate in the international market, welcoming international start-ups, thereby increasing their competitiveness and reach.

Due to the fact that international start-ups participate in accelerator programs, they often move to the accelerator location for the duration of the program, where they work under the supervision of advisors (mentors) and experts. In exchange for the intellectual services provided by the program and the future capital and cash contribution from investors that entrepreneurs receive from the accelerator, entrepreneurs transfer a share of their company equity to the program partners. For this reason, the mechanism is often referred to as a seed or venture accelerator.

Following Miller and Bound (2011) [21], accelerators with the following six characteristics were defined:

(1) A possible upfront investment offer (from 10 to 50 thousand), often in exchange for equity (5-10%);
(2) Limited support, which includes a training program and intensive mentoring;
(3) Application process open to all, highly competitive;
(4) Participants as groups or clusters of start-ups rather than individual companies;
(5) Focused mainly on small teams rather than individual founders;
(6) Networking and announcement of results at the end – at a demo or investor day. [10]

The analysis of the available literature allowed distinguishing a number of common and distinct features (see Table 3) that need to be taken into account in identifying the subject of further research.

Features have been ranked according to the degree of their importance, with a value from ○ – ●, where ○ – an occasional feature, ◑ – a common feature, ● – a critical characteristic feature (see Table 3.).

Distinguishing between critical distinctive features, primary and secondary ones have been identified:

1. Primary:
   a. Accelerators run a short-term intensive program (up to 3 months), while business incubators run a support program that lasts for the period starting with 6 months;
   b. Accelerators also act as an investor, either by investing or by setting up an investment portfolio, thus becoming a direct stakeholder in the start-up, whereas business incubators provide access to a network of investors or make a grant (targeted) contribution.
   c. Accelerators implement international programs, i.e., admitting start-ups that match a given thematic

group, without distinguishing separately between the origin of the start-up, whereas business incubators implement support programs for local market start-ups, in some cases limiting their application to a single organization, city, region, country, or target group.

Table 3

Comparison of characteristics of business incubators and accelerators
(developed by the authors)

Features	Business incubator	Accelerator
Access to the contact network	●	●
Training program	●	●
Available support infrastructure	◑	◑
Provision of mentors, experts, and consultants	●	●
At the end of the program, participants demonstrate the results achieved	◑	●
Program for start-ups in a specific field/industry	○	◑
Support for early-stage start-ups	◑	○
Support for mid- and late-stage start-ups	◑	●
The program is publicly funded	◑	◑
The program is financed from the promoter's own capital	◑	◑
The program is implemented for the local start-ups	●	○
Program is implemented for international start-ups	○	●
Short-term program (up to 3 months)	○	●
Long-term program (from 6 months)	●	○
Providing investment for participants	○	●
Provision of a grant (targeted funding) to participants	◑	○

2. Secondary:
    a. Accelerators are often implemented in collaboration with industry partners in a specific thematic area, while business incubators welcome participants without any restrictions with regard to the theme or area.
    b. Accelerators typically support late-stage start-ups (which are in the first or second stage of attracting investment), whereas business incubators support early-stage start-ups which are conceptualizing the potential of a business idea or technology.
    c. Accelerators are most often funded by equity, consisting of an investment portfolio, partner contributions, and external industry contributions, while business incubators are funded by public funding or internal contributions within a specific organization.

The definition of a business incubator has varied in the literature over time but it is mainly described as an organization established to accelerate the growth and success of entrepreneurial businesses through a range of business support resources and services, providing young entrepreneurs with the knowledge, networks, and tools they need to make their business a success.

6. CLASSIFICATION OF BUSINESS INCUBATORS

Incubation studies tend to assume that all incubators belong to some homogeneous type, although some studies have recognized the varied nature of incubators (Allen and McCluskey 1990; Aernoudt 2004; Grimaldi and Grandi 2005) [23]. In order to analyze the process of incubation, it is necessary to distinguish between the types of incubators, as different incubators achieve different results (Aer- valitudt 2004; Jose´L. Barbero, Jose C. Casillas, Mike Wright, Alicia Ramos Garcia, 2013) [13].

The literature reflects on dozens of categories, types, and characteristics of business incubators, which so far has not led to any consensus on the typology of business incubators, their characteristics, objectives, and, consequently, the indicators to be achieved.

The incubation model is the mode adopted by an incubator organization to support start-ups to increase their probability of survival and accelerate their development. It is a model or mechanism used by an organization to provide incubation services to start-ups **in order to create and attract value** (Amit and Zott, 2001; George and Bock, 2011) [22]. Incubation models have evolved since the first incubators, science parks, innovation centers, and the like were established. Researchers have followed this evolution and conducted a variety of studies focusing on different characteristics, classifications, and typologies and their evolution over time.

In addition to this basic dichotomy, studies have provided different classifications, mainly depending on strategic objectives, service offer, and competitive focus, eventually distinguishing between sectors, start-up modes, intervention phases, and geographical reach (Charlotte Pauwels, Bart Clarysse, MikeWright, Jonas Van Hove, 2015). [7]

There are different ways to categorize business incubator models. Some approaches focus on the incubator **client sector** or **the organizational structure of the incubator** – on-site or virtual environment. Incubators are also classified according to the way they are funded – private, non-profit, or government-supported non-profit incubators. (Sarfraz Mian, 2016) Despite their different purposes, overlaps between these types have also been observed, there are also hybrid business incubator models that combine characteristics of different categories. [3]

In the classification by **funding model**, a distinction is made between non-profit incubators (also called public incubators) and commercial incubators (Grimaldi and Grandi 2005; Becker and Gassman 2006a, b). [11]

Allen and McCulley (1990) defined four types of incubators that could also be qualified by **the type of funding model**, which include: profit from real estate management, non-profit, university (public funding), venture capital profit, refining the two types of funding distinguished above by Grimaldi and Grandi 2005.

Aernoudt (2004) [23] distinguished five types of incubators, which characterize the target group of the incubator: mixed incubators, incubators focused on economic development ideas, incubators supporting technology, social and basic research, or research-intensive ideas. [12]

Grimaldi and Grandi (2005) classified business incubators into five categories that can characterize the macroenvironment in which the business incubator is implemented: business innovation centers (BIC), university business incubators (UBI), technology business incubators (TBI), independent private incubators (IPI) and corporate private incubators (CPI). Becker and Gassman (2006) [11] introduced a similar but more complex classification that is more representative of the business

incubator ecosystem – public, (university, science park/technology, community), non-governmental (non-profit development), independent (association, venture capital, virtual) and business (service) to service providers and technology development) [13]. Finally, Von Zedtwitz and Grimaldi (2006) distinguished between economic business, university, independent, in-house, and virtual incubators, which characterize the microenvironment in which a business incubator operates [14].

Types of business incubators are distinguished according to their identified purpose:

(1) Development incubators: these incubators aim to achieve specific economic and/or social development goals, such as industrial restructuring, job creation, and empowerment of women, youth, and minorities. Such initiatives are often financed and/or subsidized by the state and/or municipal authorities. Their main objective is to help new businesses start and grow by providing a supportive environment (Sarfraz Mian, 2016) and to reduce economic disparities (Aernoudt 2004) [23] by maintaining local/economic networks (Von Zedtwitz and Grimaldi 2006). [7] [14]

(2) Mixed incubators: the main objective of general-purpose business incubators is to contribute to the continued growth of the regional economy through advanced entrepreneurship. While these incubators target knowledge-intensive, service-intensive, and light manufacturing companies, they also include low-tech companies. The main objective of the support is to provide access to local/regional sources of technical, managerial, marketing, and financial resources;

(3) Technology incubators: the main objective is to support technology-driven development. They are mainly located in or near universities, laboratories of large companies, innovation centers, and science and technology parks, which provide access to various support resources. Some specialized incubators also focus on specific technologies, such as biotechnology, agriculture, ICT, climate-friendly solutions, etc. Incubators facilitate technology transfer or commercialization and the transfer of new technologies to the market while fostering the entrepreneurial capacity of academia and the development of entrepreneurship in general. In some cases, they serve as corporate entrepreneurship mechanisms, focusing on technology-based *spin-outs* and subsidiaries of established firms;

(4) Accelerators: an accelerator is a specific business incubation program, usually for a specific target group (a defined technology or theme), which implements an intensive support program with the aim of attracting investment or the necessary resources for further sustainable business development;

(5) Science park or research park: a science or research park can be described as a complex set of activities in a limited geographical area around a university campus where entrepreneurs combine high-added value research, industry, and capital. The IASP has defined that a science park is managed under a formal cooperation agreement with university research centers with the aim of facilitating the attraction or creation and growth of knowledge-based enterprises.

(6) Technology park: a technology park is often larger than a science park – an economic activity area made up of universities, research centers, industry, and tertiary entities that base their activities on research and technological development. A technology park has a limited number of members, but the existing members maintain a network with both industry and research partners at international and local levels, thus extending the activities of the park beyond its geographical boundaries. The aim is to ensure synergy between industry and research and to create "centers of excellence".

(7) Business incubators: in France, incubators, usually affiliated with research and academic institutions, provide support services starting from the idea stage to the start-up of a business without providing a physical space. Typically, start-ups are located in a business incubator, which provides temporary accommodation for individual entrepreneurs and small businesses. The available infrastructure is mainly sponsored by local authorities and community actors with the aim to stimulate job creation. The role of regional and local authorities in developing economic and territorial incubation mechanisms tailored to their specific needs has been a key factor in this arrangement. (Sarfraz Mian, 2016)

Sarfraz Mian also distinguished a separate eighth type, the virtual incubator, which is operated by a central office using online tools, but as this type of business incubator is different from its implementation microenvironment, its objectives may be linked to the existing types. In some cases, on-site programs are complemented by a virtual program that provides support to companies located remotely, in another region, country, or even continent. Under these conditions, it can be assumed that the virtual incubator aims to contribute to the development of a specific area of the global economy.

The breakdown of business incubators by their economic value added, in ascending order starting with the smallest:

(1) Incubators for the development of for-profit real estate;
(2) Non-profit development incubators established by corporations;
(3) University incubators;
(4) Incubators for for-profit seed financing.

Becker and Gassman (2006) distinguished between four types of business incubators based on the source and end-customer technology – quick-gain incubators, market incubators, leveraging incubators, and in-sourcing incubators. Given this typology, knowledge kernels were identified and prioritized for different types of incubators: (1) entrepreneurial knowledge, (2) organizational knowledge, (3) technological knowledge, and (4) complementary market knowledge. (Grimaldi and Grandi 2005, Jose L. Barbero, Jose C. Casillas, Mike Wright, Alicia Ramos) Garcia, 2013) [13]

José´L. Barbero (2013) suggested four archetypes of business incubators as described in the literature (Grimaldi and Grandi 2005; Von Zedtwitz and Grimaldi 2006)) [23] [7] [14] – university, research & science-intensive incubators, private incubators, development incubators – with different characteristics and objectives:

(1) A research incubator is an incubator linked to a basic research center (Aernoudt 2004). A basic research center is an entity set up with public funds to promote fundamental research (Aernoudt 2004) [23].

(2) A development incubator, which aims to positively influence the economic development of the sphere of influence and incubate SMEs with global potential (Von Zedtwitz and Grimaldi 2006) [11]. Development

incubators aim to "focus on filling gaps in economic development" (Aernoudt 2004) [23].

(3) University incubators, which can be categorized into two groups (Mian 1996):
   a) Those providing classic incubator services (shared facilities, services)
   b) Those providing access to university-related services (experts, technology transfer, equipment, staff training).

   University incubators have a common goal: to commercialize university technologies (Allen and McCluskey 1990; Clarysse et al. 2005; Salvador 2011).

(4) Private incubators are incubators owned by large corporations; they are aimed at facilitating entrepreneurship in the capacity of a contact point and transferor of knowledge between business units (Becker and Gassmann 2006a). [16]

The breakdown of business incubators by their economic value added, in ascending order starting with the smallest:

(1) Incubators for the development of for-profit real estate;
(2) Non-profit development incubators established by corporations;
(3) University incubators;
(4) Incubators for for-profit seed financing.

Aranha (2003) identified four (4) comprehensive incubator models, which are ***bricks and mortar*** (focusing on the provision of equipment, office support, and on-site services such as administrative support); ***virtual portal*** (providing a range of services electronically, as well as access to a limited amount of funding); ***the hub*** (offering a specialized range of high-quality services but providing a limited amount of funding to its clients; and their cooperation network with the external actors is underdeveloped, informal and contradictory); and ***eggubator*** (forms specific business networking alliances both internally and externally that offer good sources of funding). They offer a full range of services, provide high-quality information and act as a parent company, service provider, network and support source, cradle, and incubator. All other incubator models are integrated therein. (Aranha, 2003) [16].

The academic literature often refers to a technology business incubator instead of a business incubator, which is a physical environment, a professional management team, an admission and graduation policy, a set of different business management services, and access to a network of contacts, knowledge, capital, and university resources. (Cohen, 2013) [24]. Cohen (2013) [24] believed that a technology business incubator is a core group that is further subdivided into two distinct sub-groups:

(1) Science business incubator: a mechanism for commercializing research and development, hence, it is not surprising that universities and other research organizations have been the main developers of technology incubator programs. Previous research findings have shown that technology business incubators linked to universities tend to focus on the commercialization of university technologies while also providing local economic development advantages.
(2) Technology business incubator – a university-affiliated incubator that typically offers access to advanced technology laboratories, equipment, and other research and technical resources, such as faculty, staff, students, and libraries.

One of the major challenges in incubator-incubation research is that it is difficult to establish a control group of non-incubated companies whose development outcomes can then be compared with the incubated enterprises (Sherman and Chappell, 1998).

7. CONCLUSIONS

The study allows making a number of conclusions and raising questions for future research.

(1) The concept of a business incubator has evolved rapidly along with the development of different types of business incubators;
(2) Business incubators can be classified differently depending on the overall settings;
(3) Performance indicators depend on the classification of the business incubator;
(4) The increase in the number of business incubators can be related to the population figures of a given region or country.

Based on the conducted research and results thereof, researchers should develop a business incubator taxonomy model that would include categories and types, including performance indicators.

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