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ACADEMIC BUSINESS INCUBATORS AS A TOOL IN IMPLEMENTING ENTREPRENEURSHIP EDUCATION – THEORETICAL APPROACH

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Abstract:

In recent years, in order to stimulate economic growth, the importance of innovation and entrepreneurship has been increasingly recognized by practitioners and teaching staff. Universities must contribute to this growth, as a center of knowledge creation and a center of research. However, transforming academic research into marketable products and services faces significant challenges. Addressing these challenges has necessitated the emergence of academic incubators as an essential mechanism for providing resources, support, and an environment suitable for the development of startups. Thus, academic incubators are becoming an essential component of a university in order to recruit and retain students, instructors, and researchers with an entrepreneurial mindset, as well as to stay exposed to students who are becoming more and more interested in starting enterprises or social projects. In these conditions, the present paper aims to provide an overview of the role of academic incubators in stimulating innovation and entrepreneurship in universities, emphasizing their role, functions and impact in the socio-economic environment.

Key words: *business incubators, academic incubators, entrepreneurship, innovation*

1. Introduction

In the context of a competitive market, characterized not only by high risks but also by attractive rewards, young people are increasingly interested in developing creative ideas and following the path of entrepreneurship. In facilitating these efforts and leading them to success, universities, through academic incubators, provide entrepreneurial environments that create connections and accelerate the processes from idea to MVP (minimum viable product) and startup.

Academic incubators are a totally different concept from the classic approach through courses and seminars. The main purpose being the exchange of ideas between students, investors, collaborating companies that they might not otherwise meet, incubators lead to strategic partnerships between the academic environment and the local

or national business environment. Consequently, they provide the framework for exploring entrepreneurial ideas and can provide: counseling and mentoring, coworking spaces or maker spaces, conference rooms, laboratories, etc.

To remain exposed to students increasingly interested in launching businesses or social projects, to attract and retain students, professors and researchers with an entrepreneurial spirit, academic incubators have become a vital part of a university. As ecosystems, they bring together curious people, programmers, designers, creatives, investors, visionaries, thus being useful on the one hand for students interested in connecting with the market and on the other hand for companies that want to recruit talents, people with an entrepreneurial mindset. Incubators also allow companies to participate in cutting-edge research without having to invest significant resources.

2. Literature review

A business incubator is an entity that supports a startup, an early stage company, an innovative idea from the ideation stage to the first customer and the transformation into a successful business. Incubators are designed to achieve various goals, such as “commercializing new technologies from universities, diversifying local economics, serving minority entrepreneurs and creating jobs” (Al-Mubarak and Busler, 2010).

The Batavia Industrial Center (created in 1959 at Batavia New York) is widely recognized to be the first incubator. In the ‘60s and ‘70s incubation programs spread at a low pace followed by a fast increase after the ‘80s, in the ‘90s and beyond (Hackett and Dilts, 2004; Dee et al, 2012). The growth was driven by several factors, out of which it is important to mention: favorable legislation (like the Bayh-Dole Act in US, 1980), the emergence of the third mission of higher education institutions (late ‘90s), more emphasis on innovation and intellectual property rights, development of ICT, recognition by policymakers of the potential of incubation to help job creation (OECD policy in 1997). It is also relevant that in the last decades of the XX century industry associations were established (US National Business Association, 1984; UK Business Incubation, 1998; European Business Innovation Centre Network approved by EC in 2002).

The research on incubator-incubation started in the ‘80s. The first major results were published by Temali and Campbell in 1984: *Business Incubator Profiles: A National Survey*. In 1987 other two important literature reviews became public. One by Campbell and Allen: *The Small Business Incubator industry: Micro-level Economic Development*, and the other one by Kuratko and LaFollette: *Small Business Incubators for Local Economic Development*.

Hackett and Dilts (2004) consider that there was no significant progress in synthesizing the research done on incubators and incubation since the ‘80s, so they conducted a review of 38 selected studies (26 empirical and 9 non-empirical studies, 1 national survey and 2 dissertations). The studies were classified based on five research streams: studies related to the development of incubators (published between 1984 and 1987), studies related to the configuration of incubators (published between 1987 and 1990), studies related to the development of the incubatee (published between 1987 and 1988), studies related to the impact of incubator-incubation (published between 1990 and 1999), studies that have a

theoretical approach on incubators and the incubation process (published between 1996 and 2000).

Hackett and Dilts (2004) define a business incubator as a physical location shared by its incubatees that are provided “with a strategic, value-adding intervention system (i.e. business incubation) of monitoring and business assistance”. The resources are provided by the incubator with the objective of “facilitating the successful new venture development of the incubatees while simultaneously containing the cost of their potential failure”. The authors are emphasizing that a business incubator is more than a facility. It is also “a network of individuals and organizations including incubator manager and staff, incubator advisory board, incubatee companies and employees, local universities and university community members, industry contacts, and professional services providers such as lawyers, accountants, consultants, marketing specialists, venture capitalists, angel investors, and volunteers”.

Despite a history of half a century of business incubation, yet there is not a clear conceptual framework. The Centre for Strategy and Evaluation (2002) defined a variety of models based on two criterias: business support and technology level.

Table 1 Incubator models

Technology level Management support	low	medium	high
low	Industrial Estate	Business Park	Science Park
medium	Managed Workshop	Enterprise Centre	Innovation Centre
high	Multi-purpose Business Incubator	Business & Innovation Centre	Technology Incubator

Based on CSES, 2002

CSES also takes into consideration other criteria to classify incubators: for-profit / non-profit incubators; university-related/non university-related incubators; virtual/physical incubators. In the US the majority of incubators are non-profit and The National Business Incubation Association classifies them further in: stand-alone incubators; incubators that operate as departments of universities; incubators that work with other organizations to achieve their mission (Al-Mubarak and Busler, 2010).

Incubators can be classified according to various criteria such as their objectives, ownership structure or the types of services they provide (Grimaldi and Grandi 2005). Academic incubators develop strong links with universities and research institutions and focus on promoting entrepreneurship to students and commercializing their academic research.

Depending on the field of activity, business incubators can be (Romanian Business Incubators Law no. 102/2016):

- business incubators with a mixed portfolio - target companies with growth potential from a wide range of activity sectors;
- technological incubators – target companies that offer advanced technology;
- academic business incubators - aims at SMEs whose activity resides in the application or use of research and development activity within a university or research institute or develops the entrepreneurial initiative from the university environment, with the objective of retaining young people in the community and commercializing the developed technologies and developed by students or faculty;
- business agri incubators - aimed at SMEs or agricultural companies;
- social business incubators - use entrepreneurship and innovation to create social impact;
- incubators specific to a sector - target companies that have a feasible idea, applicable in a certain sector of activity;
- virtual incubators - offer incubation services via the Internet, in the form of business portals.

The type of incubator plays an important role in its vision and direction and sets the tone for what happens inside it. An academic design gives the opportunity to choose the mode of work and gives students a picture of the leap from campus to the workplace.

Some universities prefer to have thematic incubators if the institution focuses on a specific sector, for example: technology incubators, healthcare incubators, agritech incubators, fashion tech incubators, etc. It is preferable for each incubator to attract a team of strong industry experts who have strong field experience in the area of strategy, marketing, and financing. These incubators are designed to initiate strategic partnerships between academia and industry.

Some researchers contributed to identifying the objectives of academic incubators such as Mian S. A. (1997), Grimaldi R. and Grandi A. (2005), Rothaermel F. T. and Thursby M., (2005a), Etzkowitz H. (2002), Clarysse B., et al. (2005), Shekhar H., Satyanarayana K., Chandrashekar D. (2023), Noha A. H. (2020). As a conclusion, among the specific objectives of an academic incubator, we mention:

- creating a favorable business environment to the development and growth of businesses established by students;
- promoting the entrepreneurial culture and improving the managerial performance of students;
- the consolidation of a dynamic private sector, able to face competitive forces and international competition;
- increasing the number of competitive economic activities, strengthening the investment climate, as well as reducing the unemployment rate among higher education graduates;
- the development of the local, regional, national and international economic environment, through more efficient use of the existing economic and human potential;
- the establishment and development of innovative businesses, capable of effectively using existing resources and which, at the end of the incubation period, will be in a financially stable situation;

- creating an efficient relationship between the university and the entrepreneurial environment;
- the development of a business infrastructure capable of coping with competitive pressures;
- favoring the access of incubated businesses to information, professional consulting services, sources of financing, as well as to management and entrepreneurship courses;
- promoting close cooperation between the main partners at national, regional and local level to achieve sustained economic development.

Dee et al. (2012) highlight the connections identified in the literature between “the presence of universities and the activities of proximate incubators”. Incubatees benefit from the access to laboratories, research resources, human resources like faculty and students. Still, there is no unanimous recognition of the role of universities in the incubation process as a critical success factor (Vij and Hitesh, 2013). Other important factors of success of incubators were identified by Vij and Hitesh like the commitment and support of the government and the highly educated incubators managers.

Although the terms ‘incubator’ and ‘accelerator’ are often confused, in fact they are two completely different programs, with the sole common goal of supporting the business environment. In both cases, we are talking about programs designed to help startups, through mentoring, networking or exchange of best practices but the difference lies in the stage of development of the startup that enters the program. Basically, in incubation programs an initiator of a business idea enters, who wants to benefit from mentoring precisely to put his idea into practice and bring it to the startup level, while an accelerator is a later stage of the phase of business incubation (Bone et al., 2019) (see differences in Table 2).

Table 2 Differences between an incubator versus accelerator

Incubators	Accelerators
Long-term programs (usually between 1 and 3 years)	Programs that run for shorter (3-6 months)
Mostly aimed by startups at the beginning	Addressed to companies with a solid base, in the development process
Often provide participants with logistical (including work space) and financial support	Intensive structure to help entrepreneurs move more smoothly and quickly through certain life stages of the business, networking, access to financing
Provide networks of resource people, who contribute to obtaining clarity, on one hand, and the realization of concrete actions, on the other (consulting and mentoring)	Provide resource people and a well-organized program, sometimes divided into modules (consulting and mentoring)
	Ends with an important event – either a pitching session or an actual product launch

Developed by authors

3. Methodology

Through this research we aimed to highlight the role of academic incubators in stimulating innovation and entrepreneurship development within universities. To achieve the objectives, it was necessary to understand the changing role of universities and, at the same time, the importance of academic incubators that contribute to a redefinition of a university's mission. No less important is the relationship between the incubator and entrepreneurship by explaining the opportunities and challenges it faces.

The research methodology used in this paper is a qualitative one that involves an analysis of specialized literature to outline the impact of the academic business incubator on the university, entrepreneurs and society. The deep theoretical approach proposed by the authors comes to answer the purpose of the research proposed above and the fulfillment of the research objectives.

The references used come from several scientific articles, reports, statistics and online resources.

4. Discussions

More and more recent research has brought into discussion the study of academic incubators, which leads to the recognition of their growing importance in the global innovation ecosystem. The literature on academic incubators is rich and diverse, exploring aspects such as their structure, models, impact on startups and universities, and overall contributions to economic development.

The research carried out by Amezcua A. et al. (2013) show that startups incubated in academic environments tend to have higher survival rates and are more likely to obtain external funding compared to non-incubated firms. This conclusion is also supported by Rothaermel and Thursby (2005b), who show that the support provided by academic incubators, such as mentoring, consulting, networking and access to finance, are essential factors in the success of new firms.

4.1. The impact of academic incubators

The impact of university incubators on innovation and entrepreneurship can be seen at three levels: startups, the university and the economy as a whole.

The impact on startups - as we mentioned above, several studies (Campbell and Allen, 1987; Kuratko and LaFollette, 1987; Hackett and Dilts, 2004, Rothaermel and Thursby, 2005b, Amezcua, 2013) have shown that startups that participate in incubation programs have a higher chance of success and, at the same time, are more likely to be noticed and funded. Smilor (1987) considers that there are several benefits generated by incubators, in general, for incubatees: more credibility, accelerated learning curve, rapid problem solving process, and a large entrepreneurial network available. By supporting startups, incubators make it easier for them to face various challenges such as market knowledge, funding and business experience. Moreover, incubated startups often benefit from high credibility by being associated with a reputable academic institution.

The impact on universities results from an increase in the role of the university in the field of innovation by offering the results of research to the market (Hassan, 2020). At the same time, through the development of incubators, universities benefit from partnerships with various companies, attracting additional funds for research and improving their reputation in the field and in entrepreneurship. Moreover, incubators can serve as a platform for experiential learning, allowing students and researchers to gain hands-on experience in entrepreneurship (Rukmana et al, 2023).

The impact on the economy resides on the one hand at the macro level, by contributing to regional and national economic development, thus contributing to job creation, technological development and attracting investments. Successful commercialization of scientific research can lead to the emergence of new industries or the revitalization of existing ones, stimulating economic growth and competitiveness (Hofer et al, 2010; Dee et al, 2012; Vij and Hitesh, 2013; Hassan, 2020).

4.2. Challenges for academic incubators

Although the positive impact of academic incubators is evident, the literature also brings up some challenges. Bergek and Norrman (2008) point out that academic incubators often struggle with limited resources, especially in terms of balancing innovation and financial sustainability. Many academic incubators have limited financial resources, which can limit the range and quality of services they offer. Securing sustainable funding is a common challenge, especially for incubators in regions with less developed innovation ecosystems.

Rukmana A Y et al. (2023), also mentions as key barriers of academic incubators, the absence of experienced mentors, the lack of opportunities to connect with various relevant stakeholders, but also institutional constraints and bureaucratic obstacles.

In addition, research by Mian (1996) highlights possible divergences between the academic mission and business goals of university-affiliated incubators, which could complicate decision-making and affect the overall effectiveness of the incubator. This can create tensions, particularly when commercial success involves taking risks that may not be aligned with the university's priorities.

Measuring the success of academic incubators can also be challenging because of the long time horizons involved in bringing new products to market. Traditional indicators, such as the number of startups created or funding attracted, may not fully capture the incubator's impact on knowledge transfer and economic development.

4.3. Global landscape of university business incubators

University business incubators have become extremely popular in the last decade. They are primed as the “future of education”, a testing ground for innovation and a place where entrepreneurial students can develop their skills. Thus, globally many universities have developed incubators around them, with different impact and performances.

According to UBI Global (2023) the impact and performance of the programs depend on 21 dimensions splitting in 7 categories like: Economy enhancement, talent

retention, competence development, access to funds, access to network, program attractiveness, post-graduation performance (see Table 3).

Table 3 Scoring framework for the world benchmark study

No.	Categories	Subcategories	Dimensions
1	Value for ecosystem (33.3%)	Economy enhancement (22.2%)	Jobs created & sustained (6.7%)
2			Sales revenue (6.7%)
3			Graduates (4.4%)
4			Self-generated revenue (4.4%)
5		Talent retention (11.1%)	Client startups accepted (6.7%)
6			Graduate retention (4.4%)
7	Value for client startups (33.3%)	Competence development (8.9%)	Services offered (4.4%)
8			Coaching and mentoring hours (4.4%)
9		Access to funds (11.1%)	Total investment attracted (6.75)
10			Average investment attracted (2.2%)
11			Seed funding attraction (2.2%)
12		Access to network (13.3%)	Partners (6.7%)
13			Events (4.4%)
14			Alumni engagement (2.2%)
15	Value for program (33.3%)	Program attractiveness (15.5%)	In-state applications (6.7%)
16			Out-of-state applications (4.4%)
17			Sponsorship attraction (4.4%)
18		Post-graduation performance (17.8%)	1-year survival rate (4.4%)
19			5-year survival rate (4.4%)
20			High growth enterprises (4.4%)
21			Qualified exists (4.4%)

Adapted by authors from UBI Global (2023)

Starting from these dimensions, the programs with the best performances worldwide in terms of the value they offer to the ecosystems as well as to their clients but also to the attractiveness itself, are presented in the Table 4.

Table 4 World top 10 university business incubators

Program (Listed alphabetically)	Partner Universities	Country
Centech	Ecole de technologie superieure	Canada
Incuba UdeC	Universidad de Concepcion	Chile
IPN Incubadora	Universidade de Coimbra, Instituto Politecnico de Coimbra	Portugal
ITU Cekirdek	Istanbul Technical University	Turkey
McGill Dobson Centre for Entrepreneurship	McGill University	Canada
Prendho	Universidad Tecnica Particular de Loja	Ecuador
Red Nacional de Incubadoras de Empresas de la UNITEC	Universidad Tecnologica de Mexico (UNITEC)	Mexico
University of Toronto Entrepreneurship	Universidad of Toronto	Canada
UtrechtInc	Utrecht University, University Medical Center Utrecht, University of Applied Sciences Utrecht, HKU University of the Arts Utrecht	Netherlands
YTU Yildiz Technopark Entrepreneurship and Incubation Center	Yildiz Technical University	Turkey

Sowah J. (2023), The UBI Global World Rankings of Business Incubators and Accelerators (2023)

5. Recommendations for increasing the efficiency of academic incubators

To maximize their impact, academic incubators have to be designed taking into account the enabling/success factors. Hassan (2020) has synthesized three success factors: qualified human resources, shared space and technology, networking. In their study, Rukmana et al (2023) found out key enabling factors to be: access to resources (facility, technology), mentoring and expertise, networking, funding and financial support. So, in synthesis we can say that the elements needed to build an incubator are threefold: physical resources (facility, research laboratories, advanced technology), human resources (talent both in what concerns teachers and students with an entrepreneurial mindset, but also mentors with expertise from the business sector) and financial resources (both to finance the business incubator but also to provide financial support for the incubatees).

In conclusion, academic incubators in their endeavor to maximize their impact, besides relying on the physical resources provided by the home institution, should consider the following strategies:

Strengthening partnerships with the business environment: Building strong partnerships can help grow the resources and experience of incubated startups. Partnering with successful companies can give startups market access and credibility.

Diversification of funding sources: In order to be sustainable, incubators should diversify their funding sources by turning to government grants, sponsorships and other income-generating activities such as consulting services or holding shares in the incubated companies.

Promoting an entrepreneurial culture: Universities must play a key role in promoting an entrepreneurial culture by integrating entrepreneurship education into their curricula and by encouraging teachers and students to engage in these activities. This organizational culture can increase the flow of ideas and talent within the incubator.

Developing customized support programs: Different startups have different needs, so incubators should offer customized support programs that address the specific challenges that different startups face.

In addition to these recommended strategies, there is of important help any governmental support in terms of regulation and financing. We bring to the attention the Romanian case. In this respect, the Ministry of Education in Romania promoted in 2017 an order related to the organization and functioning of entrepreneurial student organizations (ESO) within universities. According to this Ministry Order (no. 3262/2017) universities were supposed to implement and allocate resources for such ESO structures. Moreover, available funding for the functioning of ESO, based on a competitive basis, was available from the Ministry of Education. As stated in the Ministry Order, ESO main attributions are:

- the development of materials intended to inform and guide students in making a business plan,
- organizing mentoring activities for students who want to establish a start-up,
- encouraging mentor-student collaboration in order to consolidate and develop entrepreneurial skills necessary for future graduates,
- organizing contests for start-up projects, business ideas, etc, and to attract funding for the best projects,
- coordinating the activity of all business incubators, simulated enterprises and other entrepreneurial entities within the university.

Although some Romanian universities have also developed actual business incubators, others have opted to carry out incubation activities within the student entrepreneurial organizations established, thus benefiting from their financial support.

6. Conclusions

To fulfill their complex mission in a rapidly changing environment dominated by technology, universities have to do more than transferring knowledge and producing research. A comprehensive instruction includes among many others the development of an entrepreneurial mindset of their students and a built-in capacity of commercializing the

research outcomes and creating spin-offs. In this context, based on all the outlined ideas in this article, we conclude that university business incubators play a crucial role in promoting innovation and entrepreneurship by aiding in the commercialization of scholarly research and the establishment of new businesses. Academic incubators have a lot of potential to improve societal well-being and economic progress, notwithstanding the difficulties they encounter. Incubators can be important players in creating a sustainable ecosystem and bridging the gap between business and academia by implementing tactics to aid boost efficacy.

This article has analyzed academic incubators by emphasizing their function as well as their capacity to develop and encourage innovation and entrepreneurship. In order to optimize the effectiveness of these incubators, the study emphasized the significance of strategic alliances built by universities with business partners and successful entrepreneurs, varied funding both private and public, and an entrepreneurial culture grown within the university milieu both for students and teachers.

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