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DOCTORAL THESIS ABSTRACT

**The role of business incubators and accelerators on the
development of innovative startups ecosystem (a
comparative approach Romania – Italy)**

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INTRODUCTION

The main purpose of doctoral research is to analyze the interactions between the four pillars that can ensure sustainable development:

- start-ups (with an emphasis on innovative start-ups);
- open innovation;
- entrepreneurship (entrepreneurial culture);
- the economic context favorable to the development of an ecosystem of start-ups.

This doctoral research focused on two perspectives / parameters that we consider relevant: THE ECOSYSTEM for innovative start-ups and the GENOMA for innovative startups. The analysis approach started from the premise that the two perspectives / landmarks can help a business incubator to define its own vision, mission and the way forward to organize and provide its services.

There are elements that could only be understood from this perspective and, for this reason, in the first part of the doctoral thesis (after the presentation of incubators, based on current literature), we will try to follow their review with ECOSYSTEM perspectives of innovative startups and GENOMA for innovative startups. It is clear that start-ups (whether innovative or not) are a form of "bottom-up" development and an element of sustainable development, and the accompanying entrepreneurial culture is of enormous value to each country. Entering an economic-productive system of new entrepreneurs and new ideas, is in fact an engine for innovation of products and business processes and stimulates that interaction between people, ideas and capital that allows the development and creation of jobs, the initiation of cycles of accumulation of technological and organizational knowledge, as well as the possibility of creating new businesses. Initiating and spreading a multitude of initiatives designed to encourage and facilitate the creation and development of new entrepreneurial activities is a growing trend in the economy of many countries, and in recent years this trend has manifested itself in Romania. Obviously, both in Romania and in Italy (and in other EU countries), an aid in the activities oriented towards the proliferation of start-ups is represented by the financial support that almost all structural fund programs offer for starting and supporting start-ups. -ups (especially European Social Fund and European Regional Development Fund). Equally obvious is the need to draw attention to the ecosystem of initiatives and cooperation that must exist between the various subjects in the ecosystem, and which are able in different ways to direct and manage it.

In some economic contexts, this ecosystem of start-ups seems to develop in a natural, natural way, in a harmony of processes and relationships that interrelate without any friction, the only element of "healthy disruption" of this harmony being the competition. The "Silicon Valley" model is not so simple to take over and develop in any socio-economic-territorial context. Much more efficient, for those who believe in the value of an ideal ecosystem for start-ups, is to stimulate the commitment of the individual actors present in that ecosystem, from a certain socio-economic-territorial context. At this point, a responsibility for a new actor begins to be defined: the business incubator.

There is a clear need for continuous effort from stakeholders such as the state, local governments, universities and research centers, companies (already existing and consolidated in the market) to contribute and facilitate in various ways to create new businesses and their further development. . More specifically, the specific task of an incubator should be to identify a series of relationships and tools capable of improving the processes specific to a new company, helping the entrepreneur to face and overcome the difficulties characteristic of the initial phases of a new process of creating a start-up.

The specific objectives of this doctoral thesis are to address themes and characteristics (also comparing organizational structures and services provided in different national contexts: Italy vs. Romania) in terms of incubators and technological start-ups, to analyze and deepen the contribution that incubators make to new business initiatives. The approach of research and benchmarking should not draw attention to the so-called "genome" of the start-up and the "life-cycle", because the elements that can be used to identify the value of a service (provided by any incubator) cannot ignore the specific needs of some start-ups, and the needs analysis is linked to the "genetic map" specific to each start-up. For this reason, part of the paper will be dedicated to the entrepreneurial factors (business model, strategies, economic context, etc.) necessary for the success of start-ups, and another part will be dedicated to the activity of entrepreneurial skills, which are fundamental aspects of which the incubator must take into account if it really intends to launch its own start-ups on the market. The application part of the doctoral thesis focuses on the empirical and comparative analysis between the contexts of the incubators of Romanian and Italian innovative companies.

From a methodological point of view, the comparative analysis of the activities of incubators in Italy and Romania was performed by collecting elements that must give a "quantitative / qualitative magnitude" to the 4 groups of relevant indicators. The design of the 4 groups of indicators was made by analyzing the 4 scenarios which are a kind of 4 "cardinal points" that must guide innovative start-ups and, as such, must belong to the strategic / operational structure of each incubator.

The comparative research had the role of deducing the principles with which the indicators for the analysis / evaluation of the business incubators from the two countries will be constructed. Testing the correlations between the variables specific to business incubators in the two countries and developing an econometric model are other significant contributions of this doctoral thesis.

CHAPTER I. STATE-OF-THE-ART IN THE FIELD OF BUSINESS INCUBATORS

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 logistics structures, training and dedicated financing. These activities have the common goal of supporting 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).

Instead, the concept of "start-up" refers to the initial phase that characterizes the start of a new economic activity; situation usually characterized by a strong upward trend, negative cash flows (absence of income is a common feature), first contacts with customers, development / improvement of prototypes to become products and services, search for partnerships.

Over time, some authors have argued that new and small businesses usually fail due to lack of managerial skills and / or access to high-risk capital or that entrepreneurial actors have expertise but do not have the necessary skills. in starting a business (Zaheer et al., 2019). This is why the business incubator has become attractive and widely accepted as a means of increasing the chances of survival for new business projects. Entrepreneurship is at the heart of sustainable economic growth, both for developed and developing economies, and incubators have often served as catalysts and even accelerators for the formation and development of entrepreneurial clusters.

In general terms, we can say that incubators are entities that belong to the wider sphere of initiatives aimed at stimulating and supporting entrepreneurship and trying to combine technology, capital, professionalism and entrepreneurial experience to accelerate the birth and development of new businesses (Grimaldi and Grandi, 2005).

The objectives of the incubator can be multiple: the economic development of a disadvantaged area, the creation of jobs, the creation of start-ups in innovative sectors, the promotion of entrepreneurship, the commercialization of technology, etc. Also, the range of services offered can vary considerably: support for new entrepreneurial initiatives is usually manifested by providing assistance and support services for the formulation of business plans and business development plans, development of the entrepreneurial team, search for sources of financing and access. to specialized professional services; often the services mentioned above are accompanied by an offer of physical infrastructures (spaces, research laboratories, etc.) and other facilities. The common idea shared by most incubators is that entrepreneurial initiatives should be supported for a limited period of time, at the end of which startups should become self-sufficient, otherwise they will go bankrupt. Therefore, even the taxonomies introduced by the literature are diverse and reflect different national and institutional contexts. Grimaldi and Grandi (2005) divide incubators into four broad categories: business innovation centers, university incubators, independent private incubators, and private incubators dependent on large companies. However, there are different classifications in the literature: for

example, vonZedwitz and Grimaldi (2006) distinguish five types of incubators (university, regional business, internalized, independent commercial and virtual). In our analysis, incubators will be classified according to their public or private nature, whether or not they are profit-oriented and whether they have strong, weak or no links with universities or other research institutions. Also, regarding the theoretical notion of incubator, the reality can have quite different characteristics. The literature mentions cases of institutions whose activity is significantly different from that declared ex ante; these are incubators that are unable to provide the promised services or fail to achieve the set objectives. In other cases, incubators deal with sectors for which they do not have the necessary skills; even the best performing incubators would seem to not always be aware of the services that are actually useful for start-ups.

A significant number of studies show that incubation activity would have positive effects on macroeconomic variables (economic growth rate, increasing employment rate and commercialization of new technologies) or on microeconomics (start-up rate of survival of start-ups, turnover growth, their average size). In other works, the importance of the networking activity carried out by incubators or the availability of equipment is highlighted. In Italy (whose situation will be compared with Romania, in the following chapters of comparative research) Colombo and Delmastro (2002), compare 45 companies incubated in science parks with other non-incubated companies, and conclude that there would be no differences between the two groups. of companies in terms of innovative production, but emphasizes that incubated companies would perform better in terms of increasing employment, training, participation in European projects and developing cooperative relations.

To summarize this evolutionary perspective, it is possible to identify three fundamental dimensions around which the concept of incubator has developed over the years (Bruneel et al., 2012):

- Provider of physical infrastructure;
- Business support;
- Network access.

For summary, an indicative list of the main types of services provided by the typical business incubator is proposed according to the analysis made by Knopp (2007):

- Access to Angel Investors and venture capital;
- High speed internet access;
- Marketing and business planning assistance;
- Assistance in technology marketing;
- Assistance in forming the management team;
- Networking activities;
- Links with strategic partners;
- Intellectual property management;
- Coaching and improving presentation techniques;
- Accounting, financial management and legal assistance services.

Aernoudt (2004) proposed a classification based on the objectives of the incubator, considered closer to the economic reality, and identified five types of business incubators:

- Economic development incubator;
- Technology incubator;
- Social incubator;

- Basic research incubator;
- Mixed incubator.

Table 1.1. Classification of business incubators based on their objectives

<i>Incubator type</i>	Economic development incubator	Technological incubator	Social incubator	Fundamental research incubator	Hybrid incubator
Field	Local or regional economic disparity	The gap between new technologies and entrepreneurship	Social disparity, addressing societal needs	The gap between research results and the market	Market gap
Main objective	Regional economic development	Supporting entrepreneurship in the technological field	Integration between different social categories	Marketing of basic research results	Creating a start-up
Secondary objective	Creating new business	Supporting innovation and creating technological start-ups	Creating new jobs	Creating spin-offs	Creating new jobs
Economic sectors	All sectors	High-tech	Non-profit domain	High-tech	All sectors

Source: adapted after Aernoudt (2004)

The economic literature has extensively studied innovative start-ups and business incubators. In particular, numerous researches have focused on identifying different incubation models and evaluating their economic effects. However, the high heterogeneity of existing realities, together with the diversity of methodological approaches followed, make it difficult to compare the results obtained regarding the effectiveness of incubators. One of the objectives of the research is to identify the main contributions and relationships that involve value creation, both for incubators and for the structures accepted within them.

CHAPTER II. CRITICAL FACTORS IN THE SUCCESS OF BUSINESS INCUBATORS

Business incubators, being tools for promoting entrepreneurship and innovation, local economic growth and greater international competitiveness, have found fertile ground for their development in advanced countries in terms of such as the United States and Europe, considered two strong industrial economies internationally.

Based on its nature, a business incubator has different performance objectives: for example, we have seen that public incubators have macroeconomic objectives, such as creating new businesses to stimulate employment, while private incubators exploit the business channel. business incubation as a form of investment in innovative business projects. The different combination of factors that make an incubator work will be explored in the following paragraphs, referring to the differences between the different types of incubators presented in the previous paragraph. In this paragraph we will first proceed by clarifying the significance of success in terms of incubator performance, as this will allow us to further define which variables should be considered influential to achieve the objectives that determine the performance of a business incubator. From the analysis of the reference literature, it was possible to find out that there are distinctive elements of the success of a business incubator, even if there is no single definition of the concept of successful incubator (Kakabadse et al., 2020). In general, it is possible to identify useful factors to indicate the presence or absence of performance related to an incubation program:

- the capacity of the incubator to achieve the predefined objectives;
- the success of the companies incubated after the incubation program;
- the perception of the success of the community of interest compared to the incubator itself.

As we have seen so far, to assess whether or not an incubator is successful, often refers to its ability to achieve goals, consistent and reference incubation. The positive outcome of an incubation program can also be assessed on the basis of the success of the incubated companies once their path as tenants has ended, as this implies that the incubation program has created value for the incubated companies and led them to a successful exit. The reference to the successful exits of start-up companies from incubation is widely recognized as a factor that characterizes the positive performance of the incubator itself. This parameter is actually used to define a high-performance incubator both in the literature and through government policies for evaluating the performance of business incubators. For a new company, approaching the market in a competitive way and creating value are two difficult objectives to achieve, especially if there are no financial backers, partners, offices, qualified management, professionals and consultants, etc. Therefore, there is an initial lack of resources, knowledge and capital. This implies a very high vulnerability to market complexity and competitiveness for start-up companies. Business incubators also come into play to solve this problem: the success of a new business.

We can associate the success of the incubator with its objectives and the success of the 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. For an incubator to be defined as performing, it is necessary for the definition of its objectives and mission to be clear upstream, in order to guide the management, the incubated companies and the entire organization in the same direction. In order to achieve its objectives and, consequently, its success, the incubator has characteristics, ie internal and external variables, which affect its activity.

As for internal factors, they may consist of:

- in the objectives of the incubator itself, which has already been discussed above, - the mechanisms for selecting early-stage companies that the incubator decides to adopt (so-called screening practices);

- the resources available to the incubator during the incubation programs;

- from the choices regarding the methods and exit schedule of the incubated companies.

Internal factors have two important implications in the life of the incubator: they define the mission to which to direct the incubation activity, and based on the services they intend to provide it will become an attractive incubator or not for born companies that want to accelerate their growth.

With regard to external factors, reference is made in particular to:

- the entrepreneurial reference network for the incubator, i.e. to which new companies the incubation programs are addressed. In fact, it is important for a business incubator to have a market orientation in defining its business and the services it offers, trying to adapt to the needs of the start-up companies it intends to turn to;

- factors that stimulate the development of entrepreneurial culture and encourage the use of means such as business incubators to reduce the likelihood of new businesses failing and to speed up time to market;

- funders and promoters who contribute resources to the incubator (and, consequently, to the incubated companies) which may consist of government bodies, universities, large companies, investors and consequently on the ability of BI to find resources and skills available externally.

CHAPTER III. INNOVATIVE STARTUP ECOSYSTEMS

The ecosystem is the first of the 4 scenarios in which we will look for the elements to build the matrix of indicators and for the comparative analysis of innovative start-up incubators. In particular, in this area of research, we will focus on the network of stakeholders that populate an ecosystem and with which an incubator must build functional relationships. These functional relationships must generate opportunities that the incubator must be able to offer and coordinate for its innovative start-ups. In this first field of analysis we will try to detect and try to qualify the value for environmental factors that allow the development of innovative start-ups.

In today's competitive environment, innovation is an indispensable concept for economic and social growth, but especially sustainable. Continuous change in economic and market processes now requires stronger collaboration between universities, research actors, large companies, SMEs and innovative startups (the incubator should be the coordinator of this network of relationships) to generate wealth and economic growth (Hakala et al., 2020). Therefore, it is of fundamental importance to create open and dynamic entrepreneurial centers, capable of attracting human capital, where more relationships capable of bringing knowledge and creating values can take place.

Despite being small entities, start-ups differ from small businesses in terms of growth potential and can, in a short time, become very large companies. In a context of crisis and due to the emergence of ICT infrastructures such as open source software, cloud hosting, real-time collaboration, logistics services - which have significantly reduced the costs of launching a company - there has never been a better time to become an entrepreneur.

Given the uniqueness of each ecosystem, we can identify six generic factors that determine the birth and growth of an entrepreneurial ecosystem:

- Strategy on supporting entrepreneurship;
- Market access;
- Access to human capital;
- Access to financing;
- Support and mentoring;
- Development of an entrepreneurial culture;
- Creating networks with the economic environment and the market.

Decision-makers in developing the strategy to support entrepreneurship play an indispensable role for start-up ecosystems; with their role as "modelers" of the legislative framework, they can make the environment more friendly for entrepreneurs (Robson et al., 2009). Regulatory barriers, administrative practices and environmental restrictions can increase fixed costs and discourage entrepreneurs from starting a start-up. In order to improve the corporate "context", reducing regulatory burdens is key. As the adoption of regulations increases over time, the latter can be an increasing and disproportionate cost for start-ups. Simplification of tax and administrative codes, facilitation of payment systems is becoming a necessity. In fact, many entrepreneurs consider the complexity of tax and administrative obligations to be such a heavy burden on their business that it jeopardizes the start-up of entrepreneurial initiatives. To allow for a greater proliferation of start-up activities, it will be necessary to focus on resizing the time required to register a company, the number of

bureaucratic steps and the number of regulations and fees. Removing barriers allows for better market access: entrepreneurial opportunities will be greater in decentralized economies, with freely operating markets, as entrepreneurs will be able to operate more flexibly. The end result is a dynamic, attractive and competitive ecosystem. Moreover, in order to make the ecosystem attractive, it is necessary the presence of human capital and the cultivation of its growth. This will lead to a greater presence of serial entrepreneurs, an increase in the average level of training, as well as a better degree of specialization in the workforce.

Four stages have been identified that startup ecosystems go through: activation, globalization, expansion, integration (Table 3.1).

Table 3.1 - Stages of an entrepreneurial ecosystem lifecycle

Ecosystem development stage	Stage 1: Activation	Stage 2: Globalization	Stage 3: Expansion	Stage 4: Integration
<i>Fundamental issues</i>	Entrepreneurship; education and entrepreneurial culture; financial facilities to start business			
Aspects focused on ecosystem development	Creating a local entrepreneurial community; identifying funding opportunities	Connecting to global start-up hubs; import of entrepreneurial know-how	Supporting business scaling through financial mechanisms; removing barriers to growth	Adapting business models to various markets and customer segments

Source: personal contribution, based on literature review

Innovation projects in entrepreneurial ecosystems can be started both internally and externally, and new technologies can enter the innovation process at different stages, contrary to the way the closed model works. In the "open" model, there is no single way for projects to emerge from the innovation process and reach the market, there are several opportunities: projects can be marketed through licensing, by launching new companies through spin-offs, or they can reach the market through the company's internal channels as in the "closed" model; the projects could also be an incentive for innovative entrepreneurship and for Start-up Lab and Contamination-Lab events. This model of innovation is defined as "open", as there are many ways and stages through which ideas can access the innovation process and as many ways to reach the market.

In general, when we talk about SMEs and Open Innovation, we always think of start-ups operating in the high-tech sectors, of new companies in which small size is related almost exclusively to young age or entrepreneurial ambitions that will quickly become larger. What drives start-ups and SMEs to innovate is, according to most studies, precisely their size: being small, start-ups and SMEs are not able to lead the whole process of internal innovation and therefore, they are obliged to open up to the external environment to compensate for this lack.

Therefore, the process of innovation in start-ups and SMEs is characterized by openness to the external environment. Therefore, in order to innovate, it is essential to use networks capable of supporting SMEs and, at the same time, to develop skills that will enable the company to make the most of what the external environment can offer.

The Lean Startup philosophy is based on the “build-measure-learn” cycle and causes entrepreneurs to understand when to pivot or persevere, that is, to change strategy or to follow it further. The product as will be seen later will undergo many changes during the life cycle until the development of the right one. In general, it is much rarer to change strategy or vision. In this method, transformation does not only mean failure, on the contrary, even failure can lead to success.

The Lean Startup process consists of three parts: vision, guidance and acceleration. In the case of startups, it is necessary to use validated learning, a new type of entrepreneurial management to create a sustainable business (Bocken and Snihur, 2020). This method uses scientific experimentation and allows you to assess whether a start-up is making progress. Finally, in the “acceleration” phase in which the start-up begins its exponential growth, the techniques with which the “build-measure-learn” cycle can be repeated at maximum speed are exposed.

Therefore, Lean Startup, in order to identify the useful components among the unnecessary ones, proposes to perform experiments that allow testing its own strategy in the form of two main hypotheses. These are the value assumption and the growth assumption. The value hypothesis verifies whether a product or service brings value to the customer, while the growth hypothesis evaluates how the product is promoted by "early adopters" (first users of the product) on the market. Therefore, once an experiment has been launched, it should be addressed to the first users of business incubators.

CHAPTER IV. COMPARATIVE EMPIRICAL RESEARCH ON THE ROLE OF BUSINESS INCUBATORS IN ROMANIA AND ITALY IN THE DEVELOPMENT OF ENTREPRENEURIAL ECOSYSTEMS

The empirical study is based on four 4 pillars that were theoretically analyzed in the previous chapters (Economic System, Genetics Start-up, Lean Start-up and Open Innovation), which will highlight the indicators for data collection and the parameters for comparative evaluation. From this perspective, the objective is to create a multidimensional model in which to analyze the data obtained from the responses of representatives of business incubators in Romania and Italy and to evaluate them quantitatively and qualitatively. The multidimensional analysis model will consider 3 macro-variables:

- life cycle of the incubation process (pre-incubation, incubation, post-incubation);
- the type and characteristics of the services offered by the incubators;
- the quantitative and qualitative parameters that we will derive from the 4 pillars and that will serve as indicators to build the questionnaire and continue the analysis.

Figure 4.1 reflects the 4 pillars of the conceptual model of comparative research, which is how we will try to identify the elements on which to build the questionnaire for the comparative analysis of business incubators in the two countries: Italy and Romania. Each macro-set (divided into the three logical phases of incubation) is analyzed and sectioned into elements that assign value to the specific service provided by the incubator.

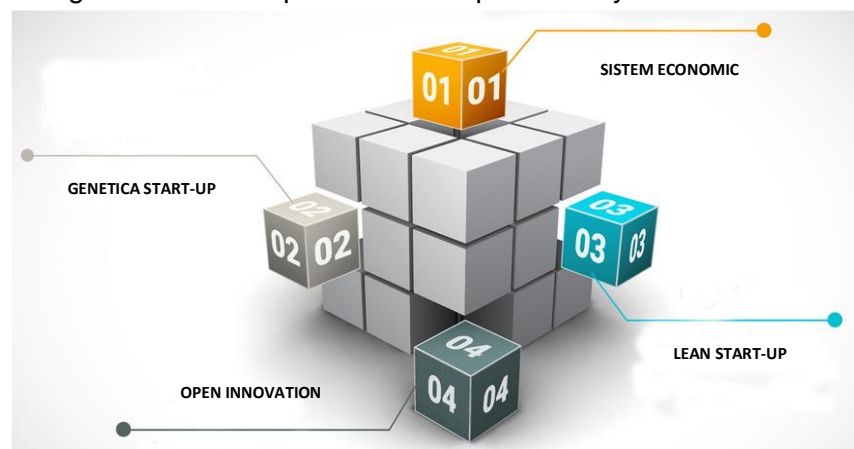


Figure 4.1 - Pillars of the conceptual model of comparative research
Source: personal contribution, based on the literature

As can be seen, each element of the conceptual model is identified and characterized by referring to the 4 scenarios analyzed above, qualifying each individual element.

The structure of the questionnaire is divided into the following macro-investigation areas:

- Demographic data
- Economic data
- Incubator / accelerator organization
- The economic system

- The selection process
- Services offered
- The incubation process

From the approximately 200 incubators / accelerators we contacted, 129 agreed to be included in the research convenience sample, of which 74 in Italy and 55 in Romania.

The main results of the comparative analysis are presented below:

- ✓ In Romania, based on the analyzed sample, 49% of incubators / accelerators have a composition that refers to public entities or are public incubators or promoted by public entities that have taken over the need for support for innovative start-ups. On the other hand, in Italy, most incubators come from private entities and are essentially private in nature;
- ✓ In Romania, the stimulation of the collaboration between the public and the private sector was achieved only at the level of financing programs, within the European development programs, but there is no regulatory intervention at system level to stimulate and facilitate this collaboration;
- ✓ both in the Italian and in the Romanian context, all incubators that are not related to academic institutions consider a lower quality level of business ideas proposed for entry into incubation programs. The graph illustrates that 80% of incubators that report non-innovative or poor quality ideas are not related to universities or research centers, respectively 80% in Italy and 87.50% in Romania;
- ✓ Romanian incubators, in particular, seem to show a certain aversion to risk and do not accept remuneration for their services by participating in the actions of the start-up;
- ✓ With regard to Italian incubators, participation in the shares / shares of innovative start-ups is the first form of remuneration and highlights a greater involvement of incubators in relation to the economic and market perspective and, finally, could be an indicator of a greater pragmatism of its institutional objectives;
- ✓ the expectations to cover the expenses are higher for the incubators in Romania. The approach of Italian incubators is contrary to this perspective, for which approximately 87% state that the amounts requested from start-ups for services do not cover more than 25% of management costs;
- ✓ most incubators, both Romanian and Italian, finance a large part of their expenses with public funding;
- ✓ Italian incubators, much more than Romanian incubators, have experienced crowdfunding to financially support start-ups and incubation programs.
- ✓ for Italian incubators the trend of cost incidence is related to the size of the organization, in terms of human resources, while Romanian incubators also follow this dynamic less visibly;
- ✓ most Italian incubators, approximately 64.86%, have 10 or more permanent employees in their own structure, while Romanian incubators that are positioned on the same segment are 27.27%;
- ✓ 32.73% of Romanian incubators said they started and organized to provide online services, and 7.27% of incubators said they organize and become virtual. In the Italian context the result is very different. Up to 75.68% of the incubators stated that they are

also virtual and, adding this percentage to that of the incubators that are organized, we reach 81%;

- ✓ in Italy, the share of incubators that are also business accelerators is higher (79.71%) compared to 39.29% in Romania;
- ✓ greater attention of Romanian incubators on employment generated by start-ups and incubation programs;
- ✓ in Italy, more than in Romania, an innovation system is maturing with a better coordination between the business and research area;
- ✓ in the Romanian context, 62.50% of incubators have an open innovation strategy, while in Italy the percentage increases to 81.58%;
- ✓ Although the communication activities of Italian incubators are more frequent and widespread, in general the activities of territorial animation on the theme of innovation and the potential of innovative start-ups are frequent and coordinated with other events;
- ✓ In the Romanian context, we notice that public incubators are the most active: 47.42% organize occasional contamination laboratories and 75.00% systematically. The value is very different for the Italian context, where private incubators are the most active, 69.23% occasionally organizing contamination laboratories and 37.14% systematically organizing them. This difference highlights, within national economic systems, a different relationship with universities and their students;
- ✓ in the context of Italian incubators we highlight a greater commitment in coordinating local strategies by multisectoral incubators, while in the Romanian context sectoral incubators are the most active;
- ✓ 71.11% of Italian incubators that have stable collaborations with universities declare an increasing qualitative trend of innovative start-up proposals and only 15.56% declare a decreasing trend. The situation is also reflected in Romania, where 55.88% of incubators that have stable collaborations declare an increasing qualitative trend and only 8.82% a decreasing trend;
- ✓ on the other hand (chart on the right) 100.00% of Italian incubators that do not have (and do not intend to start in the short term) collaborations with universities and research bodies declare a tendency to decrease the quality of start-up proposals. In the Romanian context, the phenomenon is less obvious, but even in this case, only 22.22% of incubators report an upward trend;
- ✓ In the Romanian context, there are no significant differences in the choice of how to enter the incubator (specific call, front office, hybrid), from public, private or mixed incubators. However, in the Italian context, the specific call selection and entry method is mainly used by public and mixed incubators, while private incubators use much more direct selection and mixed forms;
- ✓ From a quantitative point of view, incubators in Romania declare an upward trend (54.55%) and a much lower share a downward trend (14.55%). Regarding the trend of the quality of proposals, the evaluation is less positive and only 43.64% of incubators say that the proposals of start-ups have a higher quality, 12.73% say that the proposals are of lower quality and 43.64 % of incubators evaluate a general stability of the quality of business ideas. The Italian scenario is different, in which more than half of the public incubators (58.33%) have received over 100 requests and business ideas in the last

year. Private incubators are also in the medium-high range, 25.00% receiving over 100 applications and 35.00% between 50 and 100 applications;

- ✓ In general, Romanian incubators adopt stricter selection parameters than Italian incubators for moving to the second step of in-depth analysis and detailed analysis of business plans;
- ✓ The highest percentage of selection and inclusion in the incubation programs of start-ups in Italy (55.88%) is found at the level of private incubators, while the highest percentage of selection and inclusion in the incubation programs of Romanian start-ups (75%) are found in mixed incubators;
- ✓ Romanian incubators: the focus is on analyzing the potential of the business idea, which should be correlated with the experience and objectives pursued by the incubator (in terms of supply chain, development vision, etc.);
- ✓ Italian incubators, in addition to the potential expressed by the business idea, during the selection, try to detect the characteristics (in terms of previous skills, abilities and experiences) of the proposers or the entrepreneurial team;
- ✓ there is a significant difference in the use of the criterion of the technological content of the business ideas proposed by start-ups. From this structure we can frame the Romanian sectoral incubators in the principles of “ecosystem” and “start-up genetics”. Italian sector incubators also seem to be well positioned within the principles of Open Innovation (90% of incubators use the selection criterion based on the technological content proposed by start-ups).

CHAPTER V. QUALITATIVE-COMPARATIVE ANALYSIS OF THE PERFORMANCE OF ACTIVITIES IN INCUBATORS IN ITALY AND ROMANIA

The objective of the qualitative-comparative study carried out in this doctoral thesis is to determine the causal recipes that lead to the highest possible acceptance of business ideas in incubators in Italy and Romania, respectively the causal recipes that influence the quality of incubation programs in two countries. For this study, we use a specific QCA technique, comparative qualitative analysis using fuzzy-set or fsQCA.

We designed two hypotheses associated with this study that will be tested by the fsQCA method:

- ❖ Hypothesis 1: Different combinations of antecedent conditions associated with the selection criteria of companies in the incubator influence the degree of acceptance of business ideas in incubation programs.
- ❖ Hypothesis 2: Different combinations of antecedent conditions associated with the degree of involvement of the incubator in supporting incubated start-ups influence the quality level of incubation programs.

The expected result from the first hypothesis refers to the high degree of acceptance of business ideas in the incubator - AIA, and the previous conditions are:

- Originality of the business idea (ORIG);
- Quality of the business plan (CAL);
- Characteristics of the entrepreneurial team (CEA);
- Available financial resources (RFD);
- Field of activity in accordance with the mission of the incubator (DAMI);
- Degree of technological innovation of the business idea (ITIA).

The analyzes were performed separately on the Italian sample (74 incubators), respectively Romanian (55 incubators).

The testing of the first hypothesis on the Italian sample highlights the processing of the data in the questionnaire, noting that the responses of the representatives of the incubators were previously processed in SPSS in the correlation study presented in the previous chapter.

The Quine-McCluskey algorithm identifies a complex solution that highlights five combinations of antecedent conditions with a direct influence on the result, as well as the sufficiency relation in the first hypothesis of the configuration model, on the Italian sample (Table 5.1). The model tested is:

$$\mathbf{AIA = f(cORIG, cCAL, cCEA, cRFD, cDAMI, cITIA)}$$

Table 5.1 - The complex solution offered by the Quine-McCluskey algorithm for the Italian sample (first hypothesis)

Complex solution	Raw coverage	Unique coverage	Consistency
cORIG*cCAL*cCEA*~cDAMI	0.4386	0.0750	0.7775
cORIG*cCEA*~cRFD*cITIA	0.6836	0.0457	0.7214
cORIG*cCAL*cCEA*cITIA	0.7026	0.0328	0.7725
cORIG*~cCAL*cCEA*cRFD*~cITIA	0.1815	0.0476	0.8550
cORIG*~cCAL*~cRFD*cITIA*cDAMI	0.4978	0.0136	0.8743
Solution coverage: 0.86			
Solution consistency: 0.92			

Source : fsQCA software output

The combination with the highest consistency score (0.8743) shows us that the main predictors of the result (high degree of acceptance of business ideas in the incubator - AIA) on the Italian sample are: the originality of the business idea (ORIG); the field of activity in accordance with the mission of the incubator (DAMI) and the degree of technological innovation of the business idea (ITIA).

The testing of the first hypothesis on the Romanian sample (55 incubators) takes into account the same steps followed in the analysis on the Italian sample.

The Quine-McCluskey algorithm identifies the complex solution that highlights a single combination of antecedent conditions with a direct influence on the outcome (Table 5.2).

Table 5.2 - The complex solution offered by the Quine-McCluskey algorithm for the Romanian sample (first hypothesis)

Complex solution	Raw coverage	Unique coverage	Consistency
cORIG*~cCAL*cCEA*cRFD*~cITIA*~cDAMI	0.2163	0.2163	0.8862
Solution coverage: 0.21			
Solution consistency: 0.88			

Source: fsQCA software output

We note that the main predictors of the result (high degree of acceptance of business ideas in the incubator - AIA) on the Romanian sample are: the originality of the business idea (ORIG); characteristics of the entrepreneurial team (CEA) and available financial resources (RFD). We find in the 2 samples of incubators (Romanian and Italian) a single common indicator, namely: the originality of the business idea.

The expected result of the second hypothesis refers to the high quality level of the incubation programs - CPI, and the previous conditions are:

- Degree of incubator involvement in the initiation stage (INI);
- Degree of incubator involvement in the start-up stage of the activities (DEM);
- Degree of incubator involvement in the execution stage (EXE);
- Degree of incubator involvement in the commercial development stage (DEZ);

- Financial support granted to incubated start-ups (FIN);
- Providing services as a business accelerator (ACC)

The complex solution generated by the Quine-McCluskey algorithm highlights three combinations of antecedent conditions with direct influence on the result, as well as the sufficiency relation in the second hypothesis of the configuration model, on the sample from Italy (Table 5.3).

The model tested is:

$$\text{CPI} = f(\text{cINI}, \text{cDEM}, \text{cEXE}, \text{cDEZ}, \text{cFIN}, \text{cACC})$$

Table 5.3 - The complex solution offered by the Quine-McCluskey algorithm for the Italian sample (second hypothesis)

Complex solution	Raw coverage	Unique coverage	Consistency
cINI*cDEM*cEXE*cACC	0.6952	0.0882	0.9108
cINI*cDEM*cFIN*cACC	0.7101	0.1096	0.8770
cINI*~cEXE*~cDEZ*~cFIN*cACC	0.2564	0.0305	0.8687
Solution coverage: 0.84			
Solution consistency: 0.84			

Source: fsQCA software output

The combination with the highest consistency score (0.9108) shows that the main predictors of the result (high quality level of incubation programs - CPI) on the Italian sample are: the high degree of involvement of incubators in the initiation stage (INI); the high degree of involvement of incubators in the start-up phase (DEM); the high level of involvement of the incubators in the execution stage (EXE) and the provision of services and as a business accelerator (ACC).

The Quine-McCluskey algorithm illustrates the complex solution that highlights six combinations of antecedent conditions with direct influence on the result, as well as the sufficiency relation within the second hypothesis of the configurational model, on the Romanian sample (Table 5.4).

Table 5.4 - The complex solution offered by the Quine-McCluskey algorithm for the Romanian sample (second hypothesis)

Complex solution	Raw coverage	Unique coverage	Consistency
~cINI*~cDEM*~cEXE*~cDEZ*~cFIN	0.2319	0.1070	0.8631
cINI*cDEM*~cEXE*~cDEZ*cACC	0.1390	0.0186	0.7953
cINI*cDEM*cEXE*cDEZ*cFIN	0.4378	0.1871	0.8994
~cINI*~cDEM*cEXE*cDEZ*cFIN*~cACC	0.0967	0.0161	0.8888
cINI*cDEM*~cDEZ*cFIN*cACC	0.1581	0.0100	0.8567
cINI*cDEM*cEXE*cFIN*cACC	0.2196	0.0050	0.8074
Solution coverage: 0.63			
Solution consistency: 0.83			

Source: fsQCA software output

The combination with the highest consistency score (0.8994) shows us that the main predictors of the result (high quality level of incubation programs - CPI) on the Romanian sample are: the high degree of involvement of incubators in the initiation stage (INI); the high level of involvement of incubators in the start-up phase (DEM); the high level of involvement of incubators in the implementation phase (EXE), the high level of involvement of incubators in the commercial development phase (DEZ) and the financial support provided to incubated start-ups (FIN);

We note that in the Romanian sample is not found as a predictor for the result and the provision of services as a business accelerator (ACC), as in the case of the Italian sample.

A preliminary conclusion of these qualitative-comparative analyzes is that the results obtained illustrate the differences between the perceptions of the representatives of the business incubators in the two countries regarding the most influential predictors of the performance of the incubation activities in these countries.

CHAPTER VI. CONCLUSIONS, PERSONAL CONTRIBUTIONS AND FUTURE RESEARCH

At this moment, following the principles of impact and sustainability and trying to collect as much data as possible in the four areas of investigation that we have identified (economic ecosystem, Lean Start-up, genetics of Start-ups, Open Innovation), we are in position to define indicators that could present the positioning of incubators, precisely in relation to their strategic and operational structure, assessing how their organization is functional for impact and sustainability. From another perspective, beyond the statistical analyzes performed in the previous chapters, our intention was to find indicators that express the potential for impact and sustainable development of incubators, with reference to each of the 4 areas of investigation.

Looking for a model for analyzing the performance of innovative start-up incubators, we will define a first set of measurements based on four groups of indicators. The 4 groups of indicators are modeled by the answers collected with the administration of the questionnaire at the incubators in Romania and Italy and are grouped in the 4 areas that the research analyzed. This research comes from the need to be able to represent a unitary value that qualifies the vision, operation and inclination of the incubator to the economic system, to the logic of Lean Start-up, to open innovation strategies and to the life cycle and needs of start-ups.

The model of indicators we propose provides a unitary value for each of these macro-areas of operation of the incubator and, at the same time, highlights the sub-elements in which the incubator should be improved in order to determine a greater impact and sustainable development. Compared to the mathematical model that will be presented in the following paragraphs, this set of indicators has been developed with reference to the target audience: innovative start-up incubators.

The main scientific contributions to the field under investigation are the following:

- through a structured review of the literature, this thesis contributes to the development of knowledge on the dynamics of entrepreneurial ecosystems, under the impact of new business support structures, such as business incubators and accelerators;
- identification based on empirical studies (quantitative and qualitative-comparative) of internal and external variables that ensure the success of business incubators and accelerators;
- theoretical and practical approach to entrepreneurial ecosystems from the perspective of Startup Genome, illustrating the role of Open Innovation and Lean Startup in their sustainable development;
- comparative analysis of indicators specific to business incubators / accelerators in Italy and Romania through a correlational study that highlights the interdependencies between these indicators in the four pillars of support of entrepreneurial ecosystems: economic system, startup genetics, Lean Startup and Open Innovation;
- the comparative study between the entrepreneurial realities from Romania and Italy regarding: the economic-financial management of business incubators / accelerators, their involvement in the elaboration of financing requests addressed to national or European competitions, the internal organization of these innovative entrepreneurship support entities, the typology of incubators (sectoral / multisectoral, public / private, virtual / physical), existence of business acceleration services in incubator offerings,

indicators and institutional objectives pursued by incubators, organization of events to promote entrepreneurial culture together with other entities such as universities, companies and authorities public, incubator / accelerator strategies on open innovation, the selection process of start-ups for incubation activities, the range of services offered to incubated companies, the degree of involvement of incubators in each stage of the incubation process, obstacle they and the risks associated with the rolling programs, in the context of each country;

- identification, through a configuration study, using the fsQCA method, of causal recipes that generate a high degree of acceptance of business ideas in incubators in Romania and Italy, as well as causal configurations that influence the quality of incubation programs in the two countries;
- determining the factors related to incubation and acceleration programs that positively influence sustainability in entrepreneurial ecosystems;
- understanding the potential of business incubators / accelerators to generate technological and social innovation by connecting to local, regional, national and international innovation hubs;
- elaboration of a system of performance indicators for the development of a sustainable entrepreneurial ecosystem and processing of indicators through a mathematical-statistical modeling, which highlights the positioning of incubators / accelerators in the value creation chain in entrepreneurial ecosystems.

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