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RISK ANALYSIS IN ENTERPRISES IN THE INCUBATION PHASE: a case study in a southern Brazil incubator

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Authors:

Thiago Broze
Carla Fioriolli
Eduardo Fernandes
Joana Siqueira
Carla ten Caten

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RISK ANALYSIS IN ENTERPRISES IN THE INCUBATION PHASE: a case study in a southern Brazil incubator

Thiago Broze, Carla Fioriolli, Eduardo Fernandes, Joana Siqueira e Carla ten Caten

Abstract

The incubation processes of enterprises are in general full of risks. This is a common characteristic among innovation environments. In this context, this work aims to understand the process of an enterprise in a technological incubator, from ideation to graduation, analyzing the risks involved during the life cycle before leaving for the market. To achieve these objectives, semi-structured interviews were conducted with specialists in the area of risk and innovation. Several risks were identified, organized, grouped and prioritized through the AHP (Analytic Hierarchy Process) method. It must be understood, however, that some risks must be tolerated because these enterprises are embedded in innovation environments. Risk management is a viable practice and is necessary to support the development of the enterprise and the decisions that follow it.

Key-words: Risks; Enterprises; Incubator.

1. Introduction

Enterprises have high fixed costs in their first years of life because their products or services are in the process of being developed to enter the market. That is why they need support, such as the one offered by the incubators, which provide physical structure, reducing costs, and advisory, that increases the chances of survival [1].

According to Hackett and Dilts [2], incubators are shared spaces that provide a lot of resources both technological and organizational and business assistance to contribute to the success of new enterprises. Hence, incubation is necessary so these enterprises can develop self-sustainability and corporate structures, avoiding or reducing their probability of failure.

The incubation process happens from pre-incubation to post-incubation. Parolin and Volpato [3] identify the steps that are part of this process: (i) ideation, (ii) pre-incubation, (iii) selection, (iv) incubation and (v) graduation (post- incubation). All these steps that take part of the development process expose both the incubator and the incubated enterprise to a series of risks, inherent or not to the innovation environment. Understanding the risks surrounding this process and knowing how to manage them is a determining factor for the success of the incubation process [4].

According to Peters et al. [5], an incubator can be seen as a structure that supports both inexperienced and creative companies. There are four categories of support that are emphasized in the literature: (i) physical space, (ii) support services, (iii) training and (iv) provisioning [6].

According to Lahorgue et al. [7], there were 384 incubators in Brazil in 2011. Incubated companies generated more than 4.5 billion Brazilian Reals in revenue and 98% of them promoted some type of innovation, being it local, regional or worldwide. Bergek and Norrman [6] also classify the type of innovation generated by incubators between local and regional. In this context, it is observed that the environment in which incubators are inserted is important and is in constant innovation regardless of the scope of innovation.

Drucker and Wilson [8] argue that innovation is the conversion from need to opportunity and is the result of a work that also depends on the strengths and weaknesses of the company and its

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competitors, the inconsistencies of the systems in general, changes in industry, demography and customer perception and new knowledge. According to Wu et al. [9], research and development of technology and market are the most typical risks in technological innovation environments as well as external risks.

There are several definitions for the term risk. One of the first was elaborated by Knight [10], stating that risk is a situation that is possible to attribute a probability distribution. Another widely accepted definition is that of Standards Australia and New Zealand Standards [11], which states that risk is the chance that something happens and that it influences project objectives and is measured by probability and impact. Damodaran [12], in turn, states that risk is the probability that a project will bring a different return on investment than expected. A similar concept is that of PMBoK, which points out that risk is an uncertain event that can have an upside risk or a negative effect (downside risk) [13].

According to Damodaran [14], risk classification is necessary to make them easier to manage. Itself states that risks can be classified as:

a) Market risks: affect a large number of companies;
b) Specific risks: affect a small number of companies;
c) Operational risks: risks that come from company operations;
d) Financial risks: combination of companies equity and debts;
e) Continuous risks: risks that remain for a long time;
f) Event risks: something unexpected;
g) Catastrophic risks: risks that have a big impact on the company;
h) Minor risks: risks that have a small impact on the company.

The COSO methodology [15] classifies risks as coming from internal or external factors. Internal factors involve human resources, process, infrastructure, and technology risks. External factors include economic, environmental, social, political and technological risks. There are several methods that aim to analyze the impact of a particular risk. These methods can be qualitative or quantitative (deterministic or probabilistic) [14].

The AHP (Analytical Hierarchical Process) method will be used in this paper, which is considered a qualitative method of evaluation. This method allows the use of subjective aspects in the analysis, being possible to consider, for example, the risk profile of the company to add intangible aspects in the analysis. In addition, this method also establishes preference between decisions associated with probability distributions. The AHP aims to assist in decision making from the use of multiple attributes. This method proposes the identification of attributes weights in the final decision and the notes for the performance of the alternatives to the attributes from paired comparisons [16].

Therefore, this article seeks to understand the process that involves the enterprise from conception to graduation to the market, aiming to identify the main risks to which the company is exposed. The mapping of the risks inherent to the incubation process occurred through unstructured interviews with specialists. After mapping, the risks were organized in groups and prioritized by the AHP method.

2. Methodology

The work was applied in a technology-based incubator, placed in the south of Brazil, linked to a Federal Institution of Higher Education. This work is a qualitative research, since it involves relations of processes and phenomena that can not be reduced to quantitative variables [17].

The development of this work happened in three steps. In the first step, an unstructured individual interview was conducted with a specialist who is member of the incubator under study. The objective of this interview was to understand how the life cycle of the enterprise within the incubator happens and from that, to structure the interviews conducted in the next step. In the second step, the purpose was to map the risks inherent in the incubation process of the enterprises.

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For this purpose, individual semi-structured interviews were conducted, according to the script presented in Table 1, with five interviewees directly linked to management, who have strategic functions in the context of the incubator. Finally, in the third step, after mapping, the risks were organized by similarity and grouped into categories. The AHP method was used to prioritize the categories, aiming to rank them in importance order, considering the relationship between the probability and impact criteria of each category. This evaluation was structured based on the analysis of the speeches of the individual interviews with the incubator members.

Table 1 - Semi structured interview script

Approach	Question
Job position	1) What's your role in the incubator?
Risks in the selection step	2) In the selection step, at which risks are the enterprises subject to?
Risks in the pre-incubation step	3) In the pre-incubation step, at which risks are the enterprises subject to?
Risks in the incubation step	4) In the incubation step, at which risks are the enterprises subject to?
Considerations	5) Are there other important risks to which the enterprises are subjected, and what would you like to add, inside or outside the previously delimited steps?

Source: Prepared by the authors

In the planning of the individual interviews, moderated by one of the authors of this study, besides the definition of the interviewees, the interview places were also defined with each one of the interviewees. The average time stipulated for each session of the second step was agreed in one hour. Data collection, in turn, was done by means of recording, with the consent of the interviewees and, subsequently, transcribed in full, with the aid of the oTranscribe website.

3. Results and discussions

The interviews were conducted individually at previously agreed places. At all times, it was sought to establish a favorable environment for the interviews, according to the punctuality and the pre-established time with the interviewees, in order to improve the development of the interviews. Table 2 shows some characteristics of these interviewees, thus addressing the current job position and the time they are inserted in the context of the incubator.

The interviewee 1 took part of the initial step of this research work and is part of the incubator's board, object of this study, where he has been working for 14 years. At first, there was a contextualization about the work and its objectives. At this step, we sought to understand the life cycle of the enterprise within the incubator, which would be useful to guide the collection of information in the next step, thus making it easier the identification of risks in such phases.

According to the interviewee 1, there are three levels inside the incubator, as shown in Figure 1: i) selection, ii) pre-incubation and iii) incubation. This last one finishes when the enterprise is able to the graduation. Selection is the ideation and conception level of the idea and includes steps such as the launch of the edict, submission and evaluation of projects, as well as the interview with the candidates and the results dissemination. Pre-incubation, in turn, consists of the step of test and validation of the idea through planning process and development of the enterprise, identification of market niche, prototyping, training of entrepreneurs and prospecting of financing sources. The last step of this level consists of renewal or addition in the pre-incubation time, incubator shutdown or incubation pass. Finally, the incubation level is related to the growth and consolidation of the project. In general, this level consists of continuous review of the previous steps mentioned in the pre-incubation.

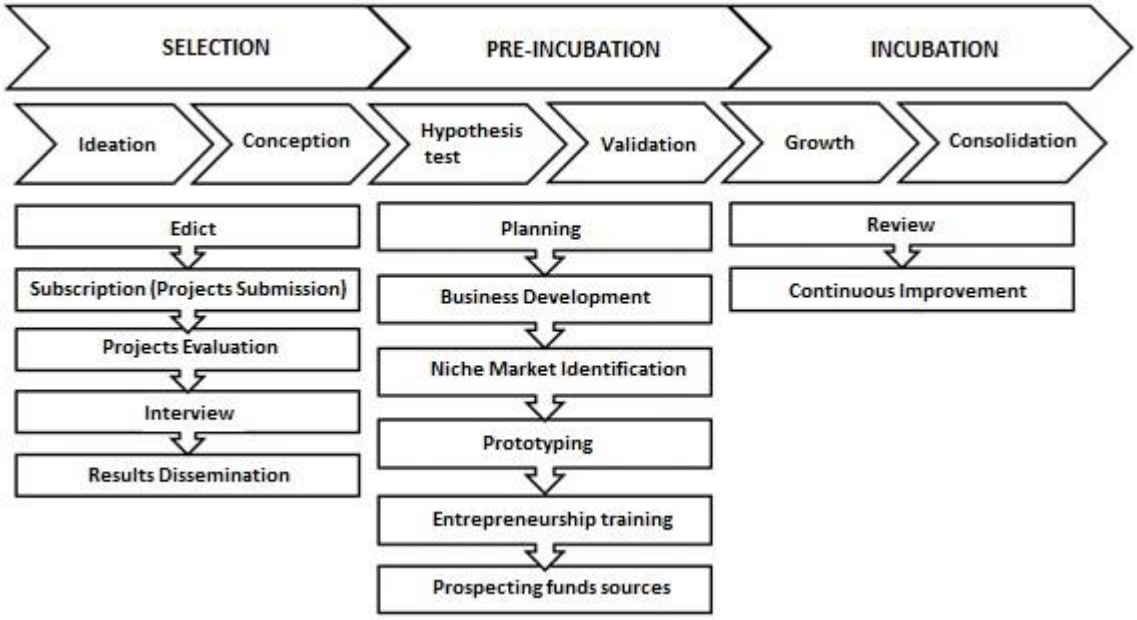
Table 2 – Basics characteristics of the interviewees in individual interviews

METHOD	INTERVIEWEES	JOB POSITION	TIME AT THE COMPANY
Individual Interviews	Interviewee 1	Manager	14 years
	Interviewee 2	Manager	5 years
	Interviewee 3	Counselor	4 years
	Interviewee 4	Counselor	4 years
	Interviewee 5	Counselor	1 year

Source: Prepared by the authors

From the understanding of the enterprise life cycle, it was possible to organize the second step of the work. Five individual semi-structured interviews were made, helping the organization of the interviewees' thinking. It should be emphasized that the objective was not to map the risks within the incubation levels for later comparison between them, but rather to corroborate that the greatest number of possible risks were exposed. These were then mapped and then categorized.

Figure 1 – Enterprise flow in the incubator



Source: Prepared by the authors

Initially, 67 risks and causes were identified. From that, the causes were eliminated, keeping only the risks. In another moment, a first grouping with the risks was made, avoiding those very similar. The initial 67 risks were reduced to 31. Finally, they were categorized as risks related to the Incubator, Edicts, Market, Entrepreneur and Enterprise, as presented in Table 3. These categories were defined based on the similarity between risks.

The category of risks "Incubator" includes questions such as selection of unwanted profile, problems caused by bureaucratic internal processes, organizational positioning of the incubator, lack of process standardization, inadequate contracts between incubator and incubated, unavailability of infrastructure, failure to render accounts and management problems.

The category "Edicts" is characterized by issues that come from the inadequate elaboration of internal edicts, the non-opening of external edicts, as well as the high competitiveness and non-compliance by the incubator with requirements present in the edicts. On the other hand, the "External" category refers to risks such as the non-adherence of the product or service by the

market, the emergence of new technologies (substitutes or competitors) and the change in the political or economic scenario, in legislation or in taxes payment, for example.

Table 3 – Organization of risks in groups

Risks Groups	Amount of Risks
Incubator	8
Edicts	4
Market	4
Entrepreneur	5
Enterprise	10
TOTAL	**31**

Source: Prepared by the authors

The category "Entrepreneur" is related to risks such as withdrawal from incubation, lack of financial resources, enterprise abandonment, non-entrepreneurial profile and changes in academic, professional or personal status.

Finally, the fifth category, "Enterprise", concerns risks of not having the financial resources to sustain incubation, inappropriate business profile, dependence on financing sources, important information leakage, lack of technical knowledge to develop the idea, failure in detailing the planning, as well as in the review of its steps, failure of the prototype and non-participation in edicts.

After risks and causes identification, information processing and risk categorization, the third step consisted in prioritizing these risks. For that, a peer-to-peer comparison method was used in the context of the decision-making process, called AHP, based on the analysis of the interviewees' discourses. The prioritization happened through the analysis of the probability and impact criteria of each risk category. As a result, the category "Edict" the one that requires more attention, followed by the Incubator, Entrepreneur, Enterprise and Market categories, respectively.

According to the interviewee 2, the "Edict" risks category appears first as a priority because the incubator doesn't have its own resources. These resources are mostly obtained through external edicts and is necessary to be prepared for non-opening them, as well as for high competitiveness and possible non-compliance with the requirements. Interviewee 2 also confirms that non-participation in the selection edicts may change the progress of all work, because there wouldn't be financial resources to support the incubated enterprises and perform basic tasks in the incubator's daily life.

In addition to the high degree of impact, risks such as high competitiveness and non-compliance with the edicts specifications are usual events. Also, based on the interviewees' discourses, the fact that the "incubator" category appears as a second priority can be justified by its responsibility to manage resources, as well as to select ideas and entrepreneurs, which includes issues such as unwanted profile selection, problems caused by bureaucratic internal processes, organizational positioning of the incubator, lack of process standardizations, inadequate contracts between incubator and incubated, infrastructure unavailability, failure to render accounts and management problems.

The "Entrepreneur" category is the third priority. The reason why this category appears ahead of the fourth category, "Enterprise", according to the interviewees, is mainly due to the entrepreneur profile, because even with an idea that, initially, does not prosper, the good entrepreneur can adapt better to different situations, replanning the enterprise.

The market category appears last in terms of prioritization. According to the interviewees, this is justified because a good entrepreneur, when advised by the incubator, can understand the market, anticipate possible risks and plan mitigation strategies, if these events take place.

4. Conclusions

Among all risk categories, those related to the edicts were identified as more critical in the incubator process studied. It is necessary to create strategies to anticipate the events related to this category, to understand which risks need to be mitigated, as well as which ones need to be seen as opportunities or need to be corrected. However, this strategy is valid for any risks categories.

During the development of this work, it is clear that the incubation environment, like any environment related to innovation, is full of risks. Throughout the development process of the enterprise, from its pre-incubation to its graduation, many risks were identified. However, it is important to understand that some risks need to be tolerated in a dynamic environment such as incubation.

It is also possible to conclude that risk management is a viable and necessary practice to support the development and decisions involved in the enterprise. In addition, the methods that can be applied to support the process of risk analysis and management must be strengthened in the same proportion as the development of the enterprise matures, from ideation to formalization through graduation.

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