

Chapter 34

An Integrative Framework for Startups at Early Stage: Promoting Evidence-Based Design and Evaluation in Early Stage Startups



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Abstract Startups sector, especially those more technological, but also those who have contributed new business models, has led to and driven innovation and growth in recent economic history. At the same time, it is well recognized that while overall startup contribution is crucial, the high risk and reward strategy followed by these startups has significant failure rates, with mortality rates around 90% before three years and a low proportion of successful startups. Despite this high percentage of failures, the literature tends to focus on successful startups and quantitative studies that seek determinants of success, but the literature is also starting to appear lately, the many lessons behind failure by examining the stories of failed initiatives. Entrepreneurial strategy can be described by different frameworks and different dimensions, and despite all the literature in the startups topic, we find a gap identified in the creation of a model that helps to follow a structured business development strategy in the early stage, learning to prioritize efforts based on right decisions in its strategy to enable the company to survive the early stage. This work aims to fill this gap and contribute to the literature by providing scalable, repeatable methodology that can be applied to databases of both failed and successful startups that passed the early stage to jump into the growth stage.

Keywords Startup · Early stage · Critical success factors · Failure · Operations · Success · Model · Simulator · Methodology

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Introduction

A long-lasting research topic of literature is the startups success in the contemporary economy, studying the impact of startups on value creation, innovation and the economy itself for each region. This belief in entrepreneurship as a potential solution to unemployment, economic growth, regional development and innovation, leads to substantial levels of public support. Despite the almost universally accepted belief outside academia that entrepreneurial activity is a positive driver of the economy, evidence is largely inconclusive [1]. In fact, we can see that a large portion of high-performing companies drive the most innovation, wealth creation and new generation of jobs, while most startups have a marginal impact [2] and a mortality rate of 92% before the age of three (getautopsy.com).

Research in entrepreneurship and startup studies over the last two decades has been quite extensive, with an emphasis on understanding the determinants of failure and success for new companies. There has recently been studied and coded new processes followed by entrepreneurs to create successful startups (the popular Lean Startup or Scalable Startup methods) and researchers have begun to study how entrepreneurs work within these frameworks [3]. Returning to the key factors of failure or success, we see how it is especially relevant for high-tech startups as these companies follow high-reward strategies that often lead to the failure or a great success, a strategy that is well suited to the business model of venture capital but leaves a high mortality rate and poor distribution of value creation.

The success and failure of early stage companies are usually studied with quantitative approaches based on financial data [4] and examining correlations with elements that have a great influence on success or failure, such as entrepreneurial ability, basic company characteristics and the characteristics of the relevant market. The literature explaining these approaches is very extensive. It has been a long time since the first models that [5, 6] proposed using a firm's financial data to predict its probability of failure, with discriminant or regression analysis models. In the 1980s, artificial intelligence models began to be used to predict financial bankruptcy. Financial data-driven approaches had the potential of being applied to a large number of companies, as data could be collected from their annual reports. However, when it comes to passing stages, specially the early stage, there are aspects that are critical such as the capacity of the entrepreneur or his origin, the basic competencies of the company, the market, etc. In this regard, other research studies investigated whether these aspects could also contribute to the success or failure of a business. For example, entrepreneurship analysis examined the influence of gender and ethnicity on the likelihood of success or failure [7]. Logistic regression analysis was also adopted [8] to model the relationship between small business mortality rates and aggregate levels of internal and external risks (e.g., bankruptcy related to interest rates, the shutdown of a business or property, etc.).

Other researchers focused on entrepreneurial attitudes and the failure caused by the mismatch between corporate goals and founders' goals [9]. Others focused on the concept of failure, all analyzed from an entrepreneurial perspective [10], realizing

that valuable lessons can be learned from their mistakes at the time the entrepreneurs launch a new venture [11].

We also find literature that focuses on emphasizing how the environment could influence startup success. The factors investigated by these works were mainly related to the differences between the regions and/or the existing industrial structure [12]. We find more recent work that looked at other potential determinants of success, such as deciding to innovate a product [13] or relying on support from a Business angel/venture capital [14].

On the other hand, there is a lot of old literature regarding the entrepreneurial strategy and how this strategy can lead to a company survival. For example, one approach to new venture strategy follows the generic strategy logic of Porter [15]. One dimension of a generic strategy is the decision to serve a broad or narrow market segment. A second is deciding to compete on the basis of low cost or differentiation. A low cost strategy aims for the firm to have lower costs than its rivals; the objective of a differentiation strategy is to offer products or services that have a distinctive difference and perceived advantage over those of the venture's competitors. Typical differentiation strategies emphasize attributes such as quality, speed, customer service, or innovation as methods to achieve competitive advantage [15–17]. All these strategies can be applied to all kind of companies, not only startups, that's why we see recent literature what decisions have been made by entrepreneurs in the early stage and how those decisions lead to failure [18].

Beyond the little research in the field of early stage companies, there is ample evidence by the entire entrepreneurial community that every startup company that focuses primarily on providing products or services to customers who actually they need and want, they will maximize their oversight over time [18]. This perspective is consistent with the entrepreneurship literature, especially one that relies on an unmet need for satisfaction.

All of the above literature tends to work from top to bottom, with researchers hypothesizing causal models for new success or business failure, testing new hypothesis into new data. On the other hand, and despite failure means non-survival, there is a very common result in tech startups researchers' attention, focused on studying success, basically due to better data availability, less attention on the reasons for failure and even less on the critical factors of survival, with very little empirical research.

Proposal

Entrepreneurial strategy can be described by different frameworks and different dimensions. The purpose of this article is to propose an integrative framework that helps fill the gap in our understanding of the effectiveness of early stage startup decisions. Based on the entire literature on startups, we defend the need in this work, for a methodology that analyzes startups in the early stage and allows them to receive

inputs from their company, in order to reduce the mortality rate of companies at early stage.

In fact, it is in more recent studies that decisions have been made by entrepreneurs in the early stage and how those decisions lead to failure [18]. Asking many entrepreneurs, they admit that strategic decisions did not fit the stage in which the company was at that stage, which often led to the death of the company. It is here that we aim to study a model that can serve as specific decision-making for companies that are in the early stage.

If we focus on the last 20 years, and on the occasion of digital transformation, many startups are born looking for incremental and/or disruptive innovation [15–17], but they fail to pass the early stage. In this period of time, there is a lack of research that examines the connection between the success and sustainability of those companies that manage to go beyond the ‘early stage’ to the ‘growth stage’. The results show that the uncertain and volatile conditions of early stage companies need to be based on a decision-making model whose primary purpose is survival. Current strategies based on traditional decision-making in companies are not effective in making positive decisions in early stage scenarios that maximize survival and sustainability. That is why it is proposed to research and create a model based on the study of critical success factors (CSF) which are necessary to ensure the success and survival of a startup in early stage [18].

Analysis of the Main Models

In reference to the strategy to be followed for early stage startups, three models have been considered as the basis for the integrative model that seeks to fill the gap when taking early stage company decisions: Sand Cone Model [18], Shell Model for early stage startups [19] and the popular Business Model Canvas [20]. The goal is to be able to integrate these three models into a joint framework that allows entrepreneurs to make decisions, taking into account all possible angles.

Sand Cone Model [18]

This model explains how early stage companies often face conflicting pressures on where and how to prioritize their efforts. This model focuses on the advantages of different competitive priorities, using an operation model sand cone, specifically applied to the context of new initiatives at the outset. The model, based on data generated by an early stage panel of companies, proposes that a competitive priority to serve client’s needs is associated with a higher likelihood of survival when companies appear. On the other hand, Stock argues that innovation and traditional marketing activities does not help survival in early stage phase. Looking at the sand cone model,

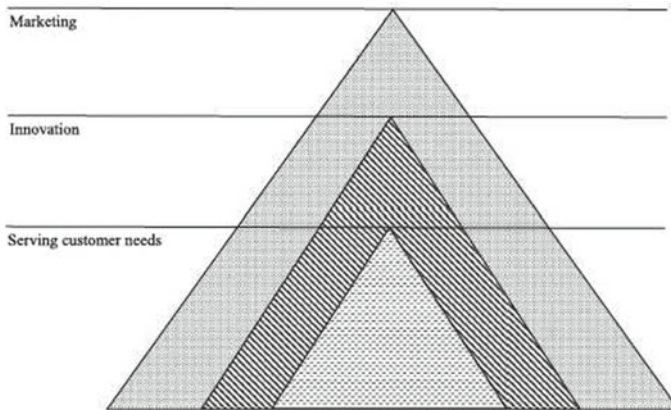


Fig. 34.1 The sand cone model of nascent entrepreneurial strategy

Stock purposes to prioritize the lower triangle, focused to serve the current needs of customers (Fig. 34.1).

The work concludes with implications for professionals and future research, and it is precisely from this point of view that it is proposed that this Sand Cone model can be integrated within a more complete framework that helps early-stage entrepreneurs making decisions to maximize their risk of survival and move to the growth stage.

In this sense, we defend the basis that the presented model is right from the point of view of operations strategy in relation to product/service and where to prioritize investments, ruling out innovations that do not have a short-term impact and avoiding costs of unnecessary marketing in the short term. But despite the success and failure cases described in the extensive literature, the reasons that can lead to non-survival go far beyond a successful operating strategy that can prioritize the important in the early stages. An example is the attitude of the entrepreneur, the alignment with their investors, the context of the market etc. For this reason, it is proposed to integrate this model within a more complete framework for early stage decision making for companies.

Shell Model for Early Stage Startups [19]

This model is based on the premise that there is a gap in the literature that analyzes the main reasons for failure of early stage startups. With this model, it is proposed a scalable, repeatable methodology that can be applied to post-mortem unstructured document databases derived from patterns that lead to early stage failure. The statistics presented at this work show how the lack of a structured business development strategy emerges as the key determinant of startup failure in most cases. In this sense,

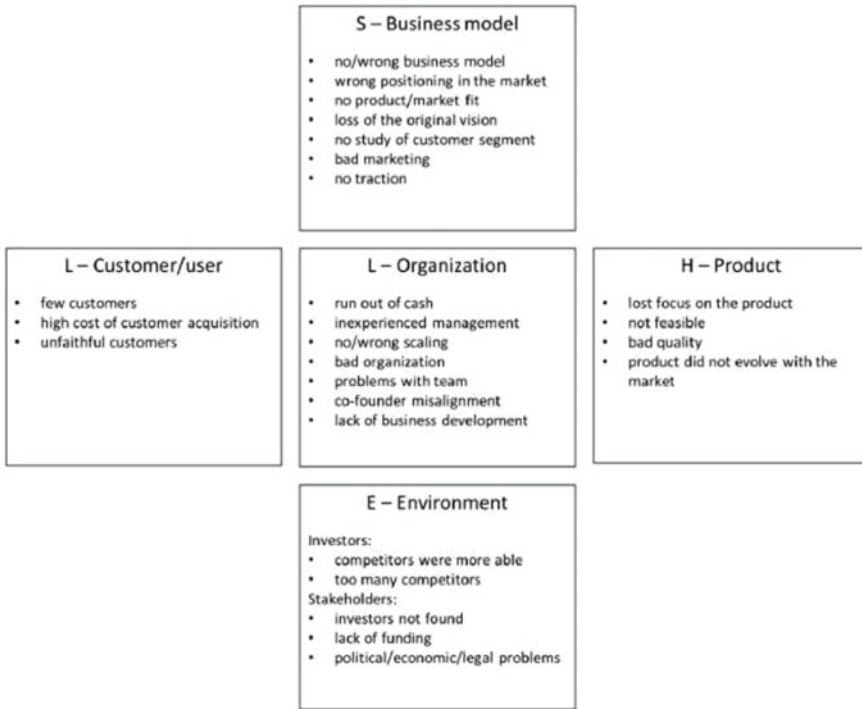


Fig. 34.2 SHELL model adapted for the classification of startups failure

it is considered a more complete model than the sand cone, which focuses only on the prioritization of certain decisions in the company’s strategy for survival (Fig. 34.2).

The first major problem of this model is that it focuses only on the causes of failure, ignoring the success factors that are also critical when making decisions that can help companies to take the leap from the early stage to the growth stage. Obviously, it is critical to avoid the main reasons for failure, but if you do not add the factors that lead to success, the model no longer makes sense for the analysis of companies that are alive and looking for answers on how to guide their strategy at this early stage.

One of the other issues detected in the model is that it generates lots of coincidences that are caused by the fixed architecture, abusing the filling exercise without deepening and correlating how quadrants can affect each other. By representing this model, a company should be able to first understand what where the real reasons for failure or see that they are in a wrong strategy in their business. Only then, companies can evaluate the model and finally consider some adaptations. However, it is a very complete model that to detect potential causes of failure, and that’s why we understand that once oriented in a simulator that encompasses the potential causes of failure but also those of success (not considered in this model) and guiding the

entrepreneur to an operational strategy that prioritizes survival, can be a very good role model for contributing to the integrative framework that we intend to build.

Business Model Canvas [20]

The Business Model Canvas is a startup strategic and startup management template for developing new or documenting existing business models. It is a visual graph with elements that describe the proposal, the infrastructure, the clients and the finances of a company or a product. As a very visual model, it helps businesses align their activities by illustrating possible deletions. In this sense, it allows prioritizing strategic decisions and helps to focus a business as long as the employer is able to understand and fill in each section so that he can evaluate the model and make adaptations to the initially thought business model (Fig. 34.3).

One of the biggest criticisms of the model is that it is designed by companies with a long history of innovation, but far from startups that have the vital goal of survival.

That is why Lean Canvas, an adaptation of Alexander Osterwalder’s Business Model Canvas, was created by Ash Maurya in the spirit of Lean Startup (Fast, Concise and Effective startup). It focuses on problems, solutions, key metrics and competitive advantages. The structure is similar to the Business model canvas, but some sections have been exchanged, making a much more designed model for early stage startups (Fig. 34.4).

Both Alexander Osterwalder and Ash Maurya model are models that help a lot to get to know a business internally, but which neglect fundamental questions regarding



Fig. 34.3 Business model canvas

Model Name:

Problem Top 3 problems	Solution Top 3 features	Unique Value Proposition Single, clear, compelling message that states why are you are different and worth buying	Unfair Advantage Can't be easily copied or bought	Customer Segments Target customers
	Key Metrics Key activities you measure		Channels Paths to customers	
Cost Structure Customer acquisition costs Distribution costs Hosting People, etc		Revenue Streams Revenue model Lifetime value Revenue Gross margin		

Fig. 34.4 Lean canvas model adapted for startups from the business model canvas

the survival of a new startup relates, in particular to factors outside the company, such as the level of competition, the industrial and investment environment ... In this sense, we intend to integrate this model into a more complete and operational model, for early stage decision-making, complementing the Sand Cone Model and the SHELL model analyzed.

Methodology

The methodology will be implemented in a decision-making simulator, based on qualitative and quantitative information on each business project. The simulator will contrast information to extract the factors that must enable startup survival and success beyond the ‘early stage’ stage. Much of the literature has been focused on value proposition and differentiation [15, 21] and on internal factors in the company, such as training and entrepreneurial experience [22].

Startup performance can be measured by a variety of outcomes, such as survival (e.g., [23–25]), revenue, profitability or success of a sale [26, 27]. In this research project, we will focus on survival, understanding that it is the key factor in the first stage of a startup.

Given the multisectoral and cross-cutting approach to the study, the research project seeks to answer some key issues that may be of interest to those who start up businesses, as well as investors and business professionals in early stage phase:

What is the characterization of a startup stage in the ‘early stage’ stage?

What are the critical factors that determine success or failure in early stage startups?

How to generate a theoretical model for the validation of critical factors for early stage startup success?

What are the drivers of an ‘early stage’ value proposition?

How do we develop a co-creation model to build a successful early stage environment simulator?

What factors do we consider that a company must fulfill in order to jump from the early stage to the growth stage?

To solve these questions, we perform three main activities: a literature review, a discussion with knowledgeable actors in the ecosystem, and an exploratory analysis of the data. The proposed research will be organized into different stages with the following structure.

Units of Analysis

In order to build a solid simulator model, a detailed analysis of the literature is needed in order to let us a better understanding of the critical factors of success in startups [28]. This understanding must be conceptually grounded, look at the inputs, processes and results, and be able to approach evaluation beyond the level of the successful professionals and entrepreneurs in the industry from whom we will extract qualitative and quantitative information.

Based on the foregoing considerations, the research will include different units of analysis, as shown in Fig. 34.5.

In more detail, the research project will compile and analyze the frameworks and indicators proposed to successful professionals and entrepreneurs through in-depth interviews and focus groups.

In addition, the research will continue with the collection and analysis of early stage start-ups, of their best practices and success stories in recent years. Subsequently, the description and representation of the data and information collected above will be carried out, with the production of schemes and frameworks for models, indicators and descriptors that will ensure the quality of the model. Finally, it will focus on research, design, testing and definition of a prototype/Simulator model for early stage startup decision making.

Given the above units of analysis, the goal will be to identify assessment models, address inputs, processes and outcomes, and define quality assurance mechanisms

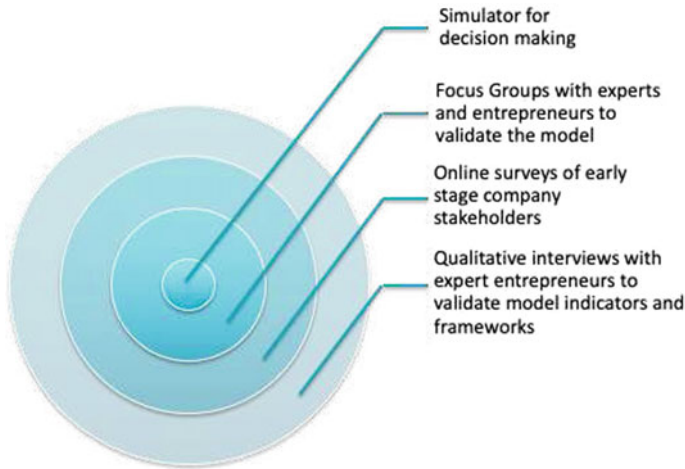


Fig. 34.5 The different units of analysis, up to the simulator. *Source* Self-elaboration

with appropriate indicators and descriptors to support evidence-based evidence in practices related to start-up business and their potential critical success factors.

Data Collection Model

The research will begin with a double data source, as described in Fig. 34.6.

The research will use different qualitative and quantitative methods in a mixed strategy. It will begin with the collection of qualitative data on career guidance policies, strategies and systems that will be illustrated through case studies; the research will use a methodological design of at least 4 case studies:

- one for startups born with less than 24 months of life;
- one for startups that have passed the early stage and are consolidated;
- one dedicated to companies that have participated in accelerators;
- one dedicated to start-ups that have emerged from incubators.

These case studies will assist in the construction of model and the models adopted and used in different birth contexts of companies. Therefore, different frameworks of business birth will be brought together, which will help build the model based on data collection and compare internationally.

Given the difficulty on obtaining all the online indicator data; some of the accelerator and incubator coordinators will be contacted to request that they share their materials and the results of the companies that have been part of them. In addition, it would be important to consider primarily those successful start-ups and “example of good practice.”

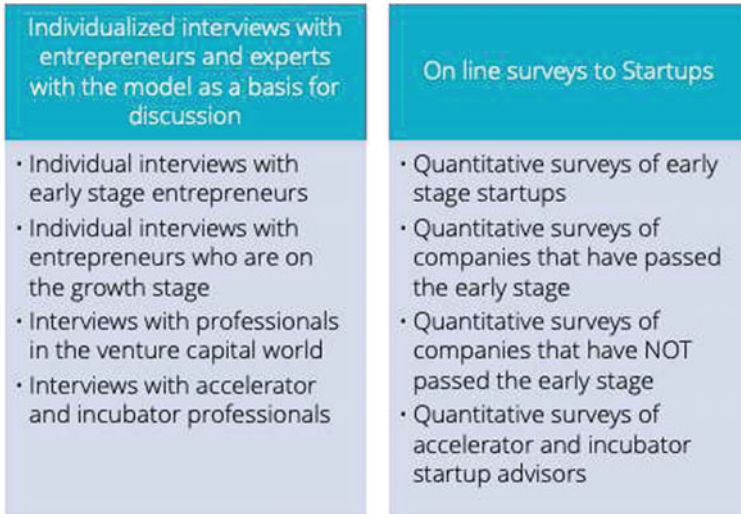


Fig. 34.6 First two different data sources for the research proposal. *Source* Own research

Subsequently, a quantitative data set will be collected during a survey, organized with startup professionals. Case study data will provide questionnaire input material to be conducted by successful professionals and early stage entrepreneur, face-to-face and online web-based questionnaires designed specifically for this research and provide additional information based on model testing, quality assurance indicators and descriptors to guide it, that will enrich the analysis of qualitative data obtained from case studies.

The purpose of collecting this data is to provide you with reliable data on the nationally-represented business orientation process of a sample of start-up entrepreneurs. These data can be complemented by other panels of entrepreneurs [29]. The data will be extracted using a Barcelona startup pool, which will allow us to extract data for the creation of the model and simulator that will be extrapolated internationally. As all studies indicate, Barcelona has become one of the world’s leading startup hubs. As you can see in this link, the startup industry is diversified by sector and the community of startups, accelerators and incubators is growing: <http://w153.bcn.cat/#/infographics>.

The increase in new startups in Barcelona in recent years have been accompanied by the consolidation of startups that have been considered successful and with significant profits or exits to other groups. As you can see in the following link, the volume of investment and new venture capital vehicles has increased significantly in the last decade: <https://startupxplore.com/blog/informe-vision-del-ecosistema-investor-startup-of-spain-2017/>.

The Barcelona startup market is considered a ‘mature’ market, with successful startups, a large number of new early-stage startups, a consolidated venture capital sector and a large number of accelerators and incubators. All this has also enabled

Barcelona to be a talented attraction market. For this reason, Barcelona is considered to be an excellent region for collecting both quantitative and qualitative data, which can be used for other startup pools internationally.

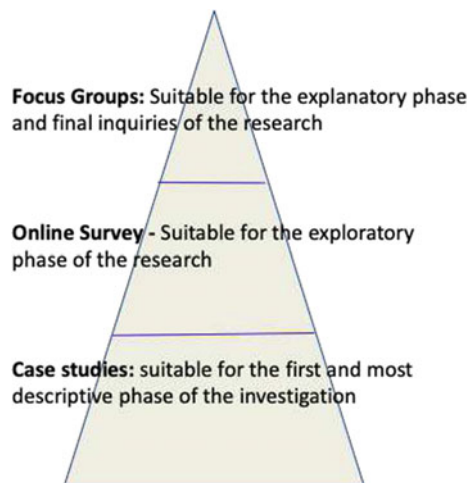
Qualitative and quantitative data, obtained respectively from case studies and online questionnaires, will be used to define a set of indicators and descriptions for successful decision-making that will ensure the survival of startups, with a focus on building a prototype model of decision simulator. In fact, the research will also include a more experimental phase; Not only will analyze and describe what already exists, but the ultimate goal will also be to propose key new indicators for innovative policies, programs and practices in decision-making that will help nascent startups identify the critical success factors (CSF—Critical Success Factors).

The research is based on a series of indicators and descriptors, already identified in the literature review and in multiple cases of startups (founding education and training, previous experience, financial resources, size market, value proposition ...); it will analyze the policies and practices existing under these indicators, adapt the indicators to make the model valid internationally and the actual conceptual frameworks, and analyze again and compare the results. If the results are positive and meaningful, the idea would be to try to extrapolate and propose indicators and descriptors in various fields to start-ups, in more specific areas.

In summary, the model will be based on several hierarchically organized research strategies as in Fig. 34.7.

Finally, the research will conclude with another set of qualitative data collected through two focus groups organized with around 8–10 entrepreneurship experts (venture capital professionals or business accelerators) and entrepreneurs who have created enduring and successful businesses over time. In these focus groups they will test the decision-making simulator to evaluate their quality and indicators, developed in the previous stages of the research project.

Fig. 34.7 The hierarchically proposed research strategies



Discussion and Conclusion

This article encompasses a large and recent startup research, proposing an integrative framework for designing and evaluating the right strategy, and making decisions that maximize startup survival. This framework proposes a holistic approach to examining the effects that are not usually included in the different models of startup analysis.

In order to produce the evidence needed to build confidence in the need for this integrative framework, there have been analyzed the entire literature on startups that analyze the critical factors that have led to failure and also those that have led to success. In the same way, there have been analyzed several models that intent to help start-ups make decisions, but which do not cover all the information needed to create a strategic framework of operations that maximizes the survival of early stage companies. That's why it is considered to create an integrative framework that fills all the gap.

These quantitative studies through modeling and experimentation allow us to examine the effectiveness of their model [19, 18], together with the strategic management model 'Business Model Canvas' [20] serve as a basis for proposing the creation of a simulator for startups that covers internal factors, external factors, critical success and failure causes.

The integrated system moved in a future simulator, aims to show that each company needs its specific strategy for its initial phase. Unifying the internal factors of the company (financial, human resources, value proposition for the client ...) with the external factors (competition, economic situation, market maturity ...) we can define a unique model for each startup, in order to maximize its survival and subsequent leap to the growth phase. To do this, we propose a simulator that feeds the data collected and must allow decision-making by companies in the initial phase. The research concludes with implications for professionals and future research in order to improve the model and simulator.

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