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Lean Startup Approach: an analysis of the approach

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Table of Contents

List of figures

List of tables

Introduction

This dissertation offers an analysis of the Lean Startup Approach, developed by Eric Ries in 2011, that has now become popular among startups and incubators. The Lean Startup Approach advocates itself as a practical tool that helps startups to find their business model, through customer understanding, continuous testing in a circular loop aimed at obtaining validated learning.

The dissertation is composed of three chapters that will offer a theoretical and empirical overview of such approach.

The first chapter focuses on the analysis of theories on entrepreneurial opportunities. It was necessary to investigate this part of the entrepreneurial literature in order to give a better theoretical understanding of the origin and the applicability of the Lean Startup Approach. In particular, it has been explored the theory related to opportunity recognition, discovery and creation, with a deeper focus on the Effectuation model by Sarasvathy and the Entrepreneurial Bricolage by Baker and Nelson.

The second chapter introduces the Lean Startup Approach, explaining its process and core elements. The analysis, based on the existing literature about the approach, focuses on main aspects like the Build Measure Learn cycle, Minimum Viable Product, Pivot, Innovation Accounting. As emerged from the study of the literature, the limitations related to the implementation of this approach have been investigated and explained in this chapter. Finally, a paragraph is dedicated to an analysis of similarities of the Lean Startup Approach and the Effectuation Model, that, even if having different background, present similar elements.

The last chapter reports the method and the results of the empirical research that has been carried out with four startups and four incubators, reinforcing the theoretical analysis with a practical point of view. In this research several elements have been assessed, mainly concerning the practical use of the approach and the exploration of its limits and benefits. Interviews focused on assessing use of the approach's elements like MVP, Pivot and at investigating potential critical issues of its adoption. Moreover, a part of general questions was dedicated to obtaining information about the external environment and the journey entrepreneurs follow to create a sustainable business model.

1. Theories on entrepreneurial opportunities

1.1 Introduction

The aim of entrepreneurship, considered as a scholarly field, is to «understand how opportunities to bring into existence *future* goods and services are discovered, created, and exploited, by whom, and with what consequences» (Venkataraman, 1997, p. 120).

In particular, the study of the entrepreneurship has been devoted to understanding why, when, and how opportunities to create new goods and services appear in the economy, why, when and how some individuals have the capability to identify these opportunities and take advantage from them, and, finally, what are the economic, psychological and social consequences for the stakeholders and for the society as a whole (Venkataraman, 1997).

From this, it is possible to understand that the concept of opportunity has always been central in entrepreneurial studies. According to Eckhardt and Shane (2003) entrepreneurial opportunities can be labelled as situation where new goods, services, raw materials, and organizing methods can be introduced as new means, ends, or means-ends relationships, and be sold at a greater price than their production cost.

According to Drucker (1985), three different categories of opportunities can be identified. The first is the creation of new information and knowledge through new inventions and discoveries. The second is the reaction to significant changes in social, political or demographic forces, which are not under direct control of the individuals. Finally, the third source is the exploitation of inefficiencies in existing markets due to information asymmetries or the limitation of existing technology to satisfy market needs.

Although the concept of opportunity is core to the theories of entrepreneurship and economics, the fundamental source of opportunity remains an on-going debate. In particular, there are three streams of economic literature with different considerations about the role of opportunities in the entrepreneurial process. These three theories are mainly based on the work of three authors, Hayek (1945), Knight (1921) and Buchanan and Vanberg (1991) and they support the notion that opportunities can be recognized, discovered or created.

1.2 Opportunity recognition

According to this theory, the opportunity to bring supply and demand together has to be recognized. The results then can be implemented via either a new or an already existing firm. This theory, based on the exploitation of existing market, is represented by the concept of the allocative efficiency of markets, discussed in the neoclassical economic theory.

The concept implies that markets are complete, and all possible combination of products and services already exist in the market. In this situation of equilibrium, it is not possible to identify a disequilibrium that can generate an entrepreneurial profit, since in the market all the transitions are perfectly coordinated, and all opportunities have already been identified.

However, there are still two ways through which profits can be gained (Sarasvathy, Dew, Velamuri, & Venkataraman, 2003). There is the possibility for the verification of temporary disequilibrium when individuals can obtain short term profits. However, this situation will quickly be neutralized by the entrance of new firms attracted by the profits. Secondly, assuming that all information is available yet randomly distributed, the profit derives from the benefit of that information and its cost. This means that all ideas are possible to exist but at a certain cost, and only once the cost issue is solved profit arises.

According to equilibrium theories, individuals are not able to recognize opportunities that others do not see, since information is randomly distributed and acquiring it implies a cost. Therefore, in this theory, entrepreneurship is explained as a characteristic of some individuals who prefers to become entrepreneurs. For example, Kihlstrom and Laffont (1979) in their model explain that inclination to uncertainty is a characteristic that is more likely to be observed in entrepreneurs rather than in employees, who are more uncertainty adverse.

To summarize, according to equilibrium theories, all individuals can recognize entrepreneurial opportunities, which implies a temporary exposure to uncertainty and costs. In addition, the key aspect that brings individuals to become entrepreneurs does not rely solely on the acquisition of information but is concerned with the fundamental attributes of people (Shane, 2000).

1.3 Opportunity discovery

The theories of the opportunity discovery assume that the goal of the entrepreneur is to exploit opportunities. These arise because of market imperfection and disequilibrium.

The opportunity discovery theory can be associated with the Austrian Theories, which state that equilibrium cannot be assumed yet it is necessary to explain how equilibrium is achieved from a non-equilibrium initial condition.

Austrian Theories explain that the market cannot have a clearing price because the different individuals have different beliefs about the value of the resources (Kirzner, 1997). For this reason, the price results are unable to convey all the information necessary to implement an economical decision, subsequently causing the failure of its role as an indicator of opportunities (Eckhardt & Shane, 2003). The price is only able to convey partial information to spot economic opportunities in existing markets, because it fails to deliver information about the implementation of new technologies or how new processes can generate value. Moreover, price is unable to give any information about markets that do not already exist because it cannot forecast future demands, the invention of new technologies or the occurrence of new needs.

Because of the different individual beliefs and the incomplete role of the price, individuals will make different conjectures about the price at which markets should clear, and they shall cast different assumptions about the potential creation of future markets (Shane & Venkataraman, 2000).

In this scope, the existence of entrepreneurship requires individuals to have different entrepreneurial conjectures, otherwise all individuals would compete to obtain the same entrepreneurial advantage, thereby eliminating the incentive to pursue that opportunity. In these situations, therefore, individuals can only make decisions based on information other than that incorporated in the price. Because of uncertainty (Knight, 1921), and information asymmetry, they are unable to apply optimizing mechanisms. As a result, «entrepreneurial discovery is the perception of a new means-ends framework to incorporate information, incompletely or partially neglected by prices, that has the potential to be incorporated in prices and thereby efficiently guide the resource allocation decision of others» (Eckhardt & Shane, 2003, p. 338).

Entrepreneurs discover a new opportunity when they make a conjecture about new means-ends that can assure a better allocation of resource compared to the combination of resources already existing on the market. The formulation of a profitable assumption about an opportunity results much more complicated than optimization in a pre-existing means-ends framework because it implies the formulation of expectation about prices of goods and services that are not already present in existing markets (Arrow, 1974). The future success or failure of the opportunity exploitation depends on this conjecture. The individuals will gain entrepreneurial profit if their conjecture is correct, or they will experience entrepreneurial loss in the case the conjecture they based their action on is incorrect (Casson, 1982; Shane & Venkataraman, 2000).

As explained before, the discovery theory assumes that the market is imperfect, and the entrepreneurs are able to modify prices and outputs in the market, thanks to their individual believes and assumptions. However, because of uncertainty and information asymmetry, entrepreneur's decisions can be incorrect and lead to errors in the market. In this situation, entrepreneurial opportunity occurs, and some individuals can discover the resources misallocation. This leads to the new theorized insight, the role of surprise and discovery. In fact, when the misallocation is recognized, individuals have discovered one's previous ignorance, and they are surprised by this profit opportunity. Hence, the basic difference between opportunity search and discover is that «what distinguishes *discovery* (relevant to hitherto unknown profit opportunities) from *successful search* (relevant to the deliberate production of information which one knew one had lacked) is that the former (unlike the latter) involves that *surprise* which accompanies the realization that one had overlooked something in fact readily available» (Kirzner, 1997, p. 72). In fact, according to the concept, the individuals are not actively searching for a determined opportunity because they ignore which misallocated resources to look for and, because of this ignorance, a deliberate search process cannot be implemented (Sarasvathy et al., 2003).

While in a neoclassical point of view actors are aware of temporary disequilibrium as soon as it arises, in this alternative theory individuals cannot systematically search for a profit opportunity. In fact, systematic search to obtain a missing information can be carried out only when the individuals are aware of which specific missing piece they are looking for and they have an approximative certainty about how to get it (Kirzner, 1997). Therefore, given the initial

condition of asymmetric distribution of information, individual beliefs and assumption, and incomplete price information, the systematic search cannot take place. Individuals, in fact, are ignorant of all the possible combinations and they can only incur in entrepreneurial opportunities.

At this point, it must be considered wrong to assume that entrepreneurship is an activity that is randomly pursued by actors and that it is only subject to random events. In fact, even if they do not know which opportunity they are looking for, successful entrepreneurs are active observers and are always ready to be surprised and to take economical advantage from this entrepreneurial surprise (Kirzner, 1997).

The new distinguishing aspect of novelty in this approach, is that it switches from a static neoclassical view of the market to a dynamic one (Sarasvathy et al., 2003). In the allocative view the market is perceived as perfect and, for this reason, static. On the other side, the discovery process metaphor offers a continuous process where new information is created, and errors are continuously recognized, ensuring a cyclical market dynamicity.

1.3.1 Opportunity discovery and individuals

Consistent with what earlier explained, Venkataraman (1997) points out that there are two premises to the opportunities discoveries that imply the arise of entrepreneurial actions. Entrepreneurship occurs because, most of the time, markets are inefficient and as such, provide individuals with opportunities to profit from the determined inefficiency. The second premise is based on the consideration that the equilibrium, that some markets might seem to achieve, is not sustainable in the long run because the entrepreneurial human condition, combined with profit opportunities and disruption of new technology and knowledge, is designed to destroy it.

As a consequence of these considerations, the entrepreneurial literature has focused on the study of the sources of opportunities and the connection between opportunities and enterprising individuals.

Since the first aspect has already been investigated in this report, the next section will be addressed to the understanding of the existing literature concerning the correlation between actors and opportunity discovery and exploitation.

Even if stated that entrepreneurial opportunities exist in the market, actors can only effectively exploit them to create profit if they are able to recognize them (Shane & Venkataraman, 2000). However, given that opportunities exist because of different beliefs of individuals, it is implicit that the opportunities are not obvious to all actors in the market, otherwise everyone will pursue the same profit opportunities. It is a consequence that, at any point in time, given opportunities will be discovered only by some groups of individuals.

This consideration can be based on the explanation of Hayek's theory (1945) about the partition of knowledge in the market. The author states that it is not possible to find in the market individuals who share the same information about the economy. Individuals will gain different information about both scientific and day-to-day knowledge. Therefore, information is not given to all actors, yet because of information stickiness, geographical and time differences, or individual personal background, only few actors will know about a particular scarcity or resources misallocations.

At the core of this aspect, there is the consideration that individuals are different, and this difference impacts their exposure to entrepreneurial opportunities (Venkataraman, 1997).

Accordingly to research (Shane & Venkataraman, 2000), there are two main factors that can influence the discovery of opportunities by particular categories of actors. The first aspect taken into consideration is the possess of **prior information** necessary to identify the opportunity. The second is related to the **cognitive properties** of individuals to understand the value of the identified opportunity.

As stated before, the existence of individual information and information dispersion (Hayek, 1945) has been recognized to have an important role for the occurrence of opportunities in the market. In addition, this aspect has a central role to explaining why certain individuals are more inclined to search for and exploit those opportunities. In fact, all human beings, through their life, gain different information that influence their abilities to recognize profit opportunities. This knowledge is, hence, idiosyncratic and specific for each individual because it has been obtained through personal experiences and circumstances, like everyone's academic background or occupation, personal daily life episodes and social interactions. This particular knowledge named "knowledge corridor", provides each individual with different lens trough which they interpret reality and they deduce profit insights (Kirzner, 1985; Nelson & Winter, 1982). This prior information is, indeed, required to be complementary with the

new information in order to let the actors understand the opportunity and trigger an entrepreneurial action (Kaish & Gilad, 1991).

The ability to recognize an opportunity and to exploit it strongly depends on this variable. In fact, a successful exploitation of an opportunity is necessarily linked with the ability of individuals to connect their specific knowledge with the commercial opportunity (Venkataraman, 1997). Since this action implies the use of skills, insights and information which are idiosyncratic and not evenly distributed among individuals, it will result in a different implementation of information, even if people might possess similar knowledge. This will lead to a distinct exploitation of the economic opportunity.

These considerations lead to the second factor that, as pointed out before, is expected to explain why certain people discover certain opportunities. Cognitive properties play an important role because they influence the capacity of people to identify new potential means-ends relationship that are generated by given changes (Shane & Venkataraman, 2000). In fact, even if individuals are able to identify an opportunity thanks to their prior knowledge, they are still exposed to failure if they cannot recognize new means-ends relationships.

This ability changes from individual to individual depending on several aspects, like cognitive conditions (Shaver & Scott, 1992), incentives (Amit, Muller, & Cockburn, 1995) or differences in creative processes (Schumpeter, 1976). In addition it has been demonstrated (Sarasvathy, Simon, & Lave, 1998) that individuals have different perceptions of events: when most people see risk, entrepreneurs see opportunities. This aspect intuitively has a huge impact on the probability of an individual to undertake an entrepreneurial activity.

Moreover, entrepreneurs have been proven to be less likely to engage in counterfactual thinking and less likely to have regrets and second thoughts on potentially missed opportunities. This is considered another cognitive aspect that influence individual's likelihood to discover opportunities (Baron, 2000).

All these aspects, investigated by several authors, can be all included in the category of individual cognitive properties, that are unique in each individual, and are all variables that impact the search and the successful exploitation opportunities (Venkataraman, 1997).

1.3.2 Exploitation of entrepreneurial opportunities

The elements that impact entrepreneurs' ability to discover opportunities have been explained, thus, the focus will now move onto outlining the elements which are considered to influence the exploitation of those opportunities. It is important, however, to take into consideration that, even if such elements can have a nexus with the exploitation of opportunities, they do not necessarily increase the probability of such exploitation succeeding.

According to Shane and Venkataraman (2000), these elements can be summarized in the **nature of the opportunity** and the **individual differences**.

It is intuitive to assert that the nature of the opportunity itself will influence the decision of pursuing it or not. The opportunity is considered attractive if the expectation about its expected returns compensate the investments implemented to pursue it, the cost of not having exploited another opportunity, and an additional premium for facing uncertainty (Kirzner, 1973; Schumpeter, 1976). Moreover, entrepreneurs will be incentivized by a larger potential demand (Schumpeter, 1976), high profit margins (Dunne, Roberts, & Samuelson, 1988), opportunity to exploit the technology for a convenient period of time (Utterback, 1994) and an optimal density of competition (Hannan & Freeman, 1984).

At this point, the individual differences that influence the decision-making process of each actor, must also be considered.

Entrepreneurs decide to exploit an opportunity if the value that can be generated outweighs the costs they have to sustain. Moreover, their decision to exploit the opportunities are further influenced by individual differences connected to past experiences and economical background. For example, individuals who can count on previous intrapreneurial experience (Carroll & Mosakowski, 1987) or on the transferability of knowledge form a past occupation (Cooper, Woo, & Dunkelberg, 1989), are more likely to engage in an entrepreneurial action. Also, social ties and social attitudes can determine the predisposition of individuals towards entrepreneurship. Stronger social ties can help individuals obtain resources with less effort, the ability to overcome adverse selection and moral hazard is considered a positive element for successful exploitation of opportunities (Venkataraman, 1997). Moreover, it has been showed that the economic background also has a role in exploitation, because individuals with

greater financial capital are more likely to actively respond to an opportunity discovery (Evans & Leighton, 1989).

All of these aspects, different from individual to individual, will have a positive impact in entrepreneurial opportunity exploitation and, in some cases, they can be the base for a successful opportunity exploitation.

1.4 Opportunity creation

The opportunity creation view differs from the before outlined theories because it does not take into consideration that the ends are ignored or imposed. Contrariwise, the telos is endogenously created by the interaction of human action, characterized by individual heterogeneous expectations and preferences (Buchanan & Vanberg, 1991).

The idea at the base of this theory has philosophical roots in the philosophy of pragmatism developed by James (1907) and Dewey (1917). It takes the distance from the evolutionary determinism which has inspired previous theories and focuses on the concept of free will of human beings. Thus, this leads the way to the notion of analysis of contingencies instead of predetermined means.

On the same scope, Hans Joas (1996) challenged the traditional view that the decision-making process has to be guided by a rational approach, proving that the nature of human action is creative. He overcame the idea that actions are intrinsically rational by stating that actions are always situated and cannot be divided by the individual's intention, that they are intrinsic corporeal and essentially social. These assumptions imply that actions can be generated because individual are included in a social environment.

Around the same time, the work of Buchanan and Vanberg (1991) moved on the same direction, as they shifted the attention onto a non-teleological model of human actions. In their work, they try to give an explanation of economics not based on rational agents but on the idea that human behaviors are inherently creative.

The garbage can model of decision making developed by March (March, 1994) is based on similar assumptions. This model assumes an irrational idea of the decision-making process, since it is not possible for people to make decisions in a distinct moment about future goals that can only be known in a future moment different from now. The effect of the decision

then, is not the result of rational processes, but is instead a result of chance and temporal proximity of choices and solutions. For these reasons, it differs from the linear approach of causal-effect that, in the past, has tried to explain success and sustainable competitive advantage.

Furthermore, Weick's theories of enactment and sensemaking move in a similar direction. In fact, he supports the concept of endogeneity of the market and he critics that the distinction between firm and environment has always precluded the idea that opportunities can also be invented rather than discovered in the market (Weick, 1979).

Simon's theory (1996) also provides for an absence of telos, as usually intended. The concept of an absolute final goal does not exist and the idea of a relative idea of it arises, since one individual's final goal is just the initial condition of another individual.

Sarasvathy (2001) based her effectuation model theory on the same stream of thoughts, according to which, there are no pre-existing goals but the entrepreneurs is given only a set of individual means. Baker and Nelson formulated their theory of bricolage (2005) based on similar assumptions.

Within all this stream of literature and theory, it is possible to notice how the concept has moved away from a rational approach and has embraced human limits, and individualities and their important role in the decision-making process. Individuals are not able to make rational choices or to make decisions today on something they will only know tomorrow. Instead, they will create their own opportunities as a result of their individual path.

The next section will further look into the theories of Effectuation and Bricolage.

1.5 Effectuation approach

Built on the idea that the entrepreneurial process can be subdivided in acts of opportunity discovery, creation evaluation and exploitation (Shane and Venkataraman 2000), Sarasvathy (2001) developed the effectuation theory, an alternative paradigm to opportunity identification for new venture creation. In this theory Causation and Effectuation are described as two different approaches to new venture creation.

The development of this approach is based on the idea that human beings are not strictly rational (Simon, 1959). Instead, their rationality is bounded by limitations, which are both

cognitive, such as psychological constraints on computational capacity (Payne, Bettman, & Johnson, 1993) and psychological, such as biases and fallacies (Bar-Hillel, 1980).

For this reason, the Effectuation model is a reversal of rational decision-making processes. In fact, it has been inspired by the question: «Where do we find rationality when the environment does not independently influence outcomes or even rules of the game (Weick 1979), the future is truly unpredictable (Knight 1921), and the decision maker is unsure of his/her own preferences (March 1982)?» (Sarasvathy, 2003, p. 206).

The author claims that human aspirations and human imagination have been for so long not been taken into consideration in the creation of economical artifacts. Entrepreneurship has traditionally been explained as inevitable product of uncontrollable forces, stochastic processes, or environmental selection, where the actor individuality had no role.

In this theory, on contrary, the entrepreneur is an agent who starts from given means and exploits contingent opportunities in order to fulfil general aspirations which details are not predetermined a priori but are built throughout the decision-making process.

This approach has a human-centered point of view and tries to provide an alternative for all those situations where the path is unclear and there are no preexistent goals, situations that difficultly match with a casual approach.

1.5.1 Causation and Effectuation processes

Causation is described as a process that take an effect as given a priori and only focuses on choosing and selecting the right means to obtain that effect. On contrary, effectuation is a process that begins with a set of means which are considered as given and focuses on selecting between the multiple possibilities of effects that can be obtained thanks to that set of means (Sarasvathy 2001).

It is important to underline that the distinction does not lay on a different end goal or aspiration, which are not relevant in terms of such difference. However, the element that distinguishes the two theories is the set of choices that lead to the final result. The causation model consists on a many-to-one approach where it is chosen between means in order to obtain a particular effect, whereas the effectuation model has a one-to-many approach where a particular set of given means is used to choose between several different effects.

Theoretical foundations for the **causation process** can be found in the rational decision-making perspectives of neo-classical micro-economics (Stigler, 1952). In fact, in a causation approach to decision-making an individual tends to base the rational choices on all the information possible to gather and on an estimated expected utility for each option (Viale, 1992). Traditional models that operate with causal rationality work in environments where well-specified goals are given, well-understood causes and past experiences enable reliable predictions, an independent external environment guides the choices of firms and individuals (Sarasvathy, 2003).

For what concerns the new venture creation, causal approach's objectives the entrepreneur wants to accomplish will be defined upfront. Then, this phase is followed by a systematic search for opportunities within developed industries, in order to meet the a priori fixed objectives. Entrepreneurs, then, evaluate the opportunities and implement only those that allow them to maximize the expected returns (Drucker, 1985). Hence, according to the causal approach, the entrepreneurial opportunities are driven by exogenous forces and the role of the entrepreneur is limited to examining the environment and the existing options in the market place. An example of causal approach is the segmentation, targeting, and positioning process proposed by Kotler (1991) for bringing the product/service to the market. This approach implies a five-phased scheme that includes: analysis of long-run opportunities in the market, research and selection of target markets; design of ad hoc marketing strategies; marketing programs planning; organization, implementation, and control of marketing effort. This type of approach is developed starting from a large general universe, proceeding to specifics. This type of approach is built on analysis and prediction and it involves considerable amounts of time, analytical efforts, and resources.

On the other side, when taking into consideration effectuation process to create a new venture, the logic moves in the opposite direction. The process starts from specific means, in particular, who the entrepreneur is, what he/she knows, whom he/she knows, then it develops to general goals. Indeed, this means that using the effectuation process does not imply any single strategic universe for the firm. Instead, the entrepreneur's possibilities are open to creating several different effects, regardless the initial generalized end goal. As entrepreneurs make decisions and face circumstances, they make use of the obtained information about observed results to change direction. Stated that the future is

unpredictable, it cannot be excluded that the *effectuator* may implement several different approaches in the market place before finding an effective and sustainable business model.
Therefore, the combination of given means and contingencies create an effect that is built as an integral part of the effectuation process. The entrepreneurs do not happen to have a particular clear vision of the optimal firm, but they only have general aspirations that guide them through the process. This implies that they do not have a priori guarantees or certain potentiality for success. Most of the time, they proceed without being sure about the actual existence of a market or a demand for their product. For this reason, it is possible to state that the effectual process seems to include, not just the identification and the pursuit of an opportunity, but the creation of it thanks to the implementation of this effectual entrepreneurial process (Sarasvathy 2001).
It has been demonstrated, through empirical researches, that entrepreneurs who apply an effectual approach are more likely to change and adapt their initial goals, co-create their opportunities with intentional agents, instead of trying to predict the future (Dew, Read, Sarasvathy, & Wiltbank, 2009).
After considering the distinction between causation and effectuation on a new venture creation level it is possible to explore this distinction on a decision-making level as well.
When taking into consideration the classical literature about decision-making, the elements of the decision include: a given goal to be achieved, a set of alternative means or causes, constraints on possible means, criteria for selecting between means. This entire process uses a general to specific approach and relies on structured goals, means imposed by the environment and maximization goals, which are all characteristics that can be reconducted to the causal approach (Sarasvathy, 2001).
On the other hand, effectual decision-making process applies an upside-down approach, from specific to general. A decision using effectual approach involves: a given set of means which consists on unalterable characteristics of the decision maker; a set of effects of generalized aspirations; constraints on possible effects; criteria for selecting between the effects. Figure 1 clearly visualizes the different approach of the two methods.

To summarize, it is possible to state that the two approaches do not have to be considered in conflict but both as valid alternatives, depending which situation the decision maker or entrepreneur are facing. The causal approach is effective when there is a set and preselected

goal, because it helps the individual to achieve the goal in the fastest, most economical and most satisfying way.

The effective method, instead, suits for those situations when the individual is facing a more dynamic situation, where effects are not predictable, and the decision-making process has to deal with contingencies. Therefore, causation can be considered effect dependent and useful in exploiting knowledge, while effectuation is actor dependent and works better in exploiting contingencies.

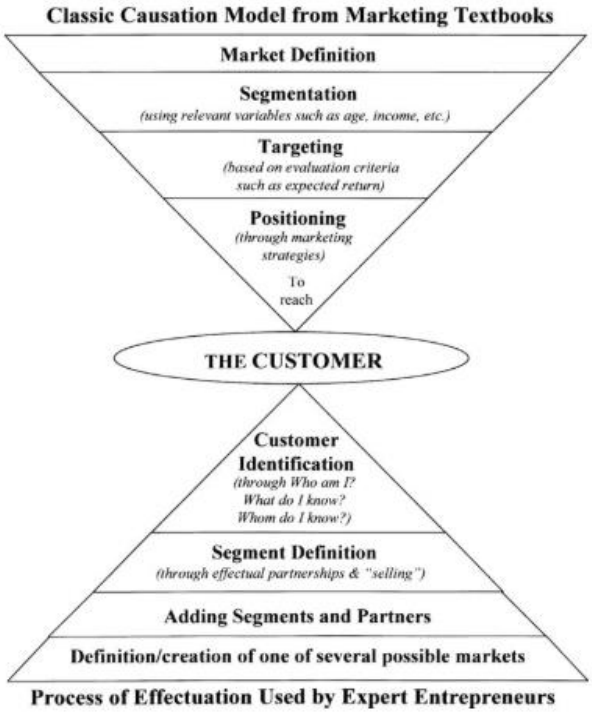

Figure 1: Effectual market creation and causal market creation (Sarasvathy 2003)

1.5.2 Effectuation principles

The whole discourse around effectuation can be summarized and embodied in four principles that together form the core of this theory (Sarasvathy, 2001):

1. Affordable loss rather than expected returns.

   The effectuation process gives more importance to the discovery of new opportunities, given limited means. The approach, then, focuses on understanding how much the entrepreneurs can afford to lose and how much it can be invested in experimenting

new different strategies. It completely turns over causal approach focalized in choosing the solution that can offer maximized potential returns.

2. Strategic alliances rather than competitive analysis.

   Effectuation does not make use of competitive analysis as causal models. Effectuation accentuates the exploitation of a cooperative network, investing in strategic alliances and pre-commitments from stakeholders. In this way, thanks to cooperative relationship based on trust and prior experience, uncertainty and adverse selection is reduced (Venkataraman 1997).

3. Exploitation of contingences rather than exploitation of preexisting knowledge.

   Because of its flexibility and dynamicity effectuation model works better with exploiting contingencies and unexpected effects from the environment.

4. Controlling an unpredictable future rather than predicting an uncertain one.

   Causation logic relies on: «to the extent that we can predict the future, we can control it» (Sarasvathy, 2001, p. 252). Effectuation, on the other side, does not focus on prediction but on management of controllable effects of an unpredictable future. For this reason, the logic of the effectuation process is: «to the extent that we can control the future, we do not need to predict it» (Sarasvathy, 2001, p. 252).

1.5.3 Elements of novelty

In this theory introduced by Sarasvathy (2001) the elements of logic of control, constructed environment and endogenous goal creation are combined in one single approach.

In particular, two factors are introduced that cannot be found in previous theories: juxtaposition of effectual reasoning with causality and the logic of control instead of planning and prediction. The two factors are combined by the author to explain the economic artifacts as a product of decision-making process adopted by effectual entrepreneurs, starting from a theoretical foundation.

Previous theories have tried to explain and research the formula of the successful entrepreneur. It was studied considering a risk-preference variable (Palich & Bagby, 1995), application or lack of strategic planning (Schwenk, 1988), flexible or conservative strategies.

However, no particular influencing characteristic or schema has emerged, since results of successful entrepreneurs included different combination of variables.

The effectuation theory starts from a different definition of research scenario. It moves away from the definition of the best personality or characteristic of the successful entrepreneur and starts to consider the environment as a collection of human individualities with their unique differences. The aim of the research shifts from understanding how to build the successful firm or how to become the successful entrepreneur. Instead, this model offers a new lens of analysis and develops starting from new questions like "What types of ideas and opportunities should YOU pursue?" and "Given who you are, what you know, and whom you know, what types of economic and/or social artifacts can you, would you want, and should you create?" (Sarasvathy 2001).

As a result of this theory, any firm is only a specific effect of a wider spectrum of combination of contingencies and given means. The strength of this doctrine, differently from many others, is that the approach is not focused on the avoidance of contingencies but on the management of unpredicted events.

The effectuation model offers a way to reduce the costs of failure, because of the consideration that the probability of failure of a new company depends on multiple factors that are not under the direct control of the entrepreneur. Hence, for this reason it cannot be reducible. In fact, it is likely that pre-firms created through an effectuation model, if they fail, will fail earlier and without involving huge investments and loss of resources, contrariwise to those arose through a causation process. It is true that effectual entrepreneurs are more likely to fail more, however, they have bigger chances to become better skilled in dealing with failure, which is considered a useful aspect in a long period focus.

In addition, this process can be considered useful by those individuals who are not following a paved road of an already existing market, but are discovering a new unstructured market, which requires flexibility and uncertainty control.

1.6 Entrepreneurial Bricolage

Bricolage is a concept developed by Lèvi-Strauss (1962), that has been brought up and shaped as an entrepreneurial theory by Baker and Nelson (2005). The Entrepreneurial Bricolage approach falls in to the category of the opportunity creation theories. In fact, the Entrepreneurial Bricolage adopts a constructivist approach to resource environments with its main idea that small companies can be able to create something from nothing, exploiting resources that have been discarded by other firms.

The work of the two authors have been inspired by the theories of scarcity, according to which firms, during initial period of their life, can experience lack of resources in terms of financial resources, human resources, knowledge resources. These initial conditions of scarcity determine a selective property of the environment where only some companies will survive. According to this model, resources are considered objective independents of specific organizations operating in environments, which affect organizations outcome (Pfeffer & Salancik, 2003).

Under these assumptions, companies have little ability to modify their resources, however, they still have two possible options to face the resource constraints. The first option consists of resource-seeking attempts to overcome this scarcity, by for example generating debt or equity inflows (Berger & Udell, 1995). The second option that organizations can take into consideration is avoiding the situation of dealing with scares resources by disbanding, downsizing or ignoring new opportunities.

However, these theories do not take into consideration situations in which organizations experience successful entrepreneurial challenges, still employing a limited set of resources, and consequently, they do not offer a theoretical explanation for such situations.

In contrasts, other theories exist, built on the ability of companies to exploit internal and external resources they have in their hand. Such approaches share similar assumptions with the Entrepreneurial Bricolage theory.

The first theory to consider is the resource-based view developed by Penrose (1959). The author states that each organization has several inputs, which can be both material or intellectual. These resources are still objective, as sustained in before mentioned theories, but how they are combined and used by companies is the result of an idiosyncratic process. For

this reason, even if companies are given with similar inputs, outputs in the market will be substantially different because of differences in organizations' ability to exploit the resources. The possibility of combinations is so wide that one single organization is not able to recognize all the possible range of services available, given any resource.

Three main considerations emerge from this approach. According to Penrose work, it can be deduced that there cannot be one organization identic to another one, having each of them an idiosyncratic relation to its resource environment. For this reason, the environment and the activities that the organization take place in it cannot be considered independent. In addition, companies are expected to differ in their ability to overcome such scarcity and survive in the market. The specification of these three concepts is useful to understand how a company can survive in an environment with limited resources, yet it does not explain the unique process companies implement during resource exploitation.

The concept of bricolage developed by Lèvi-Strauss (1962) results more useful to explain how firms successfully survive in such constrained reality. Bricolage is the skill of using what someone has at hands and recombining it to create something new. The bricoleurs start with what they have in hand and modify and recombine them together in different alternative new ways, making do with whatever they have.

The theory of the entrepreneurial bricolage developed by Baker and Nelson (2005) is based on the observation of 29 firms that were facing new challenges experiencing condition of resource constraint. The model was generated to explain the gap observed in the entrepreneurial literature and, therefore, to explain which is the process through which organizations create heterogeneous value through idiosyncratic combination of resources.

The authors describe bricolage «as making do by applying combinations of the resources at hand to new problems and opportunities» (Baker & Nelson, 2005, p. 333). In order to be understand this concept, here will be explained the core aspects.

- **Making do:** Trying to reach a goal or a solution with the resources that are directly accessible to the individual is the main aspect of this approach. According to this assumption, individuals can create something even though they do not possess the tools necessary realize it. In particular, «making do implies a bias toward action and active engagement with problems or opportunities rather than lingering over

questions of whether a workable outcome can be created from what is at hand» (Baker & Nelson, 2005, p. 334). This idea does not imply that result will be temporary imperfect solutions, but such process can sometimes lead to unexpected exceptional solutions (Strauss, 1962).

The idea is based on the refusal by individuals to enact limitations and the rejection of institutional constraints and definitions. They question the commonly accepted limitations of resources, practice, and standards, and they try to find non-conventional solutions. This is a first step towards the definition of a process that can help companies to survive with constraints resources. In addition, this consideration also leads the way to consider the role of social constructive aspect of resource environments.

- **Combination of resources for new purpose:** The importance of the ability to recombine existing resources for application different from the ones originally intended, is a second core element of this approach. Therefore, firms that apply the entrepreneurial bricolage tend to make do with considering initial resources rather than building something from scratch.

  This assumption is common to other entrepreneurial theories that consider the recombination of existing elements an important role for innovations and economic growth (Schumpeter, 1934). Moreover, this concept has been used by other authors to emphasize the fact that changes in technology, economy or institutions can often follow a creative logic (Amabile, 1983).

- **The resources at hand:** Considering the consideration of Lèvi-Strauss (1962), every bricoleur is given with a set of resources, which can be material artifacts, skills or ideas. The element of diversity is the fact that these resources are not the result of a project-related specific research whereas they are a collection of means at hand available for the actor. This individual "capital" includes resources available to the entrepreneur very cheaply or for free, sometimes discarded by other individuals (Garud & Karnøe, 2003). Baker and Nelson, in their empirical research, noticed that firms considerably varied in their ability to use the resources at hand. This can be recognized as an

important implication, suggesting the socially constructed origin of unique firm resource environments.

1.6.1 Parallel and selective bricolage

Baker and Nelson (2005), during their empirical observation, identified two different patterns of recurrent actions among companies. They have been theorized in two different types of bricolage: parallel and selective. A first group of companies was characterized by the employment of multiple ongoing projects relying on bricolage and the experience of no growth during the research. This behavior was associated with a model of parallel bricolage, named due to the tendency of companies being active on several projects. The second group of companies, yet observed to apply bricolage, instead, applied a stricter selection of projects to work on. These observations led to the formulation of the sequential bricolage model. Contrariwise to the first group, the second one did experience economic growth during the research time.

Parallel bricolage

Parallel bricolage is the type of bricolage that verifies when companies undertake several projects at the same time. In addition to this trait, companies who incurred in parallel bricolage had other similar recurrent characteristics, like regularities in the collection and storage of physical inputs, origin and breadth of the skills used by personnel, nonconformity to craft standards, industry practices, legal regulations, and the nature of their social networks.

Considering the first aspect, firms were skilled at scavenging, intended as the ability to extract value from goods that others set aside, not considering them useful. This aspect allowed companies to have a much more diversified group of tools, materials and means compared to companies that did not put into practice bricolage. From these observations, a common consistent way of organizing, maintain and catalog the inventory was not classified. However, it was consistently observed that that collection of troves was a guiding element in how entrepreneurs approached new projects (Baker and Nelson, 2005).

The second element captured is that both the entrepreneurs and most of their workers had broad self-thought skills. They did not have a formal education about the tasks they were

performing, but their knowledge was derived from practical experiences or skills they picked from connected environments.

In addition, these firms showed a similar attitude toward local codes and professional norms and standards, challenging their limits repeatedly. Firms that engaged in parallel bricolage, went beyond the constraints imposed by the institutional and regulatory environment, learning through experience which limits they could avoid or ignore. Entrepreneurs were able to find solutions that would otherwise been off limits, refusing in several occasions to behave accordingly to external rules and standards.

Another common element typical of parallel bricolage consists of embedded multiple ties related to customers and labor. The boundaries between entrepreneurs and customers were not always clear, since the last ones were often taking part to the project. Moreover, they were often part of entrepreneurs' friend network or they soon would have become part of it. Similar considerations apply to suppliers, observing that, after the end of the project, their relationship with entrepreneurs did not end, becoming customers themselves or customers' suppliers. The described circumstances helped entrepreneurs to make use of scavenged resources and take advantage of inputs acquired from their network members. At the same time, this type of connections often created vicious obligations of economical products and moderate expectations about reliability.

Companies that engaged in parallel bricolage showed to have mutually reinforced patterns. In fact, the strong network ties together with the diversification of resources encouraged the firms to undertake a broad set of projects. These multiple challenges allow entrepreneurs to learn new self-thought skills and to broaden the range of potential new activities. On the other hand, this behavior likewise implies negative consequences. Entrepreneurs could not focus their attention on discovery and exploration of opportunities of growth, while being busy on several different projects. On contrary, this led the companies to invest a lot of time and resources on disparate challenges, facing repeatedly processes of learning, experimenting and coaxing. The last action is typical of the bricolage and consists of the attempts to obtain additional use from obsolete or exhausted resources.

Several positive aspects are connected with parallel bricolage, considering the ability to create outputs from rejected inputs, to obtain free labor from customers and to create lucrative networks. Nevertheless, despite the positive ability to make do and exploit resources at hand, the use of bricolage, to overcame resource scarcity, has triggered an unhealthy cycle of

behavior and expectations. Because of that, companies did not develop organizational focus and routine that could support economic growth and profitability.

Selective bricolage

Unlike the companies that engaged in parallel bricolage, a more diversified dimension was the core characteristic of companies that applies selective bricolage. Contrary to the previous case, it was not possible to identify similar dimensions or characteristics among these firms. The only consistent evidence is that, the ability of entrepreneurs to create outputs from scarce resources. The selective choice of projects to undertake was the key difference, that allowed companies to avoid spreading their efforts among discontinuous challenges.

Firms engaged in selective bricolage made a scrupulous use of the approach, rejecting the practice once the business was established. In addition, in some situations selective bricolage was not use extensively throughout the whole business, yet in a narrow way in selected departments or for explorative goals.

Thanks to their choice to reject projects, companies were free to avoid the time-consuming process of coaxing, source of resources absorption in parallel bricolage. As a result, entrepreneurs were able to establish impersonal routines and day-to-day operation, having remaining time to dedicate to exploration of new opportunities and to focus on determinant skills.

This narrower use of bricolage helped the companies to grow by adopting a more strategic use of resources at hand. As a consequence, firms that adopted a sequential bricolage did not incurred in self-reinforcing cycle of parallel and they were able to limit its use only to selected projects.

1.6.2 Entrepreneurial implications

As product of a penurious environment, entrepreneurial bricolage can be summarized in the ability of entrepreneurs to create something from nothing, by refusing to operate within commonly accepted limitations of the environment.

Bricolage seems to facilitate a context that stimulates behaviors such as creativity, improvisation and various social skills. Its application implies the use of trial and error

processes and encourages entrepreneurs to think out of the box, increasing the likelihood of obtaining uncommon solutions.

From an entrepreneurial point of view, both types of bricolage impact the entrepreneurs' behaviors. Parallel bricolage underlines the ability to make do with scarce resources and to build a useful social network. However, because of this pattern of actions entrepreneurs are trapped in a vicious cycle that limits their possibility to exploit external opportunities.

In contrast, entrepreneurs adopting selective bricolage focus their attention on fewer domains and can avoid the self-reinforcing dynamics. The characteristics of bricolage still appear, but more time and resources were dedicated to exploration of new opportunities.

This model, proposed by the authors (Baker and Nelson, 2005), is an entrepreneurial process that aims at filling the gap present in the actual literature, focusing on how the firms exploit the idiosyncratic resource environments illustrated by Penrose (1959) and the creation of unique combination of resources.

The theoretic idea behind the entrepreneurial bricolage recalls the enactment of limitation process defined by Weick (1979). According to the author, individuals often limit themselves by failing to act and avoiding testing if something can be achieved or enacted. Bricolage counteracts this behavior and encourages individuals to pursue the opposite directions, by testing and challenging limitations. This attitude towards given standards helps firms to have an active role and create opportunities from an environment with scarce resources.

There are several advantages, identified by the authors, derived from using the entrepreneurial bricolage approach. It is expected to provide survival advantages, especially in the initial periods of new ventures, when resources are particularly low and scarce. Moreover, this approach can result as a useful tool for firms that operate in environments where resources are poor, for example when a new market is created.

Entrepreneurial bricolage is likely to be applied is in highly competitive markets, where resources are shared among several companies. Companies able to manage creatively their means and come up with alternative solutions have bigger chances to emerge.

This approach is expected to offer a new view about aspects not explored by previous theories, explaining the different behaviours firms adopt in situation of scarce resources, making a point about the idiosyncratic relationship between companies and resource exploitation.

In general, the results of Baker and Nelson research suggest that entrepreneurial bricolage can be effectively implemented to explore and create new opportunities, from situations that are rejected as not fruitful.

It can be assumed that, the entrepreneurial bricolage can be situated in the opportunity creation side of the discourse about search, discovery and creation of opportunities.
However, there are still elements that recalls important pillars of the discovery theory, which are still consistent with the creation theory.
For example, it can still be perceived the influence of the Austrian economics, that strongly emphasizes the importance of opportunities in the entrepreneurial activities (Kirzner, 1997). The second aspect is the idiosyncrasy and uniqueness of each individual's background and knowledge, valorised in the theory and used to explained the different response to entrepreneurial opportunities (Sarasvathy et al., 2003; Venkataraman, 1997). The importance of prior knowledge (Shane, 2000) is still recognized in this theory, even though the focus relies on the resources at hand knowledge, combined with the attention to gather inexpensive or free resources.
However, the core difference between these approaches is the consideration that, according to the discovery theory, opportunities are pre-existing phenomena that can be discovered by individuals (Shane & Venkataraman, 2000). Contrariwise, the creation theory explains such sequential processes as exceptions in entrepreneurship, since opportunities are created by the actors.
In fact, according to the entrepreneurial bricolage view, opportunities are not perceived as external objectives by the entrepreneurs. Many of the opportunities exist because they are the result of the idiosyncratic enactment of unique resources using the process of bricolage. The results of this approach are, hence, aligned with the previously illustrated Sarasvathy's Effectuation theory (2001), where opportunities are created rather than discovered.
In addition, in the same scope of other theories (Sarasvathy, 2001; Venkataraman, 1997), the model also emphasizes the role of the social environment affecting exploitation of the opportunities, not contemplated as the result of an individual epiphany.
Therefore, the entrepreneurial bricolage can be seen as a process of opportunity enactments in contradistinction to Austrian perspectives, which focuses on the opportunity discovery (Baker & Nelson, 2005).

To conclude, the bricolage approach enables the creation of new opportunities from idiosyncratic combinations of heterogeneous, often undeveloped, at hand resources, triggering creativity and improvisation through an interactive social process. Innovation is interpreted as a process of creating and giving new value to previously worthless resources

1.7 Causation, Effectuation and Bricolage: a comparison

In the previous sections, different entrepreneurial approaches have been analyzed. In particular, two of them are the most common approaches used to explain entrepreneurial behaviors. The first assumes that opportunities are objective phenomena already existing in the market, that the entrepreneur has only to discover. This approach has been named discovery approach (Alvarez & Barney, 2007; Sarasvathy et al., 2003) or causation approach (Sarasvathy, 2001). The second approach considered is opportunity creation (Alvarez & Barney, 2007; Sarasvathy et al., 2003), recently re-interpreted in emerging theoretical perspective as the Effectuation model (Sarasvathy, 2001) and the entrepreneurial bricolage approach (Baker & Nelson, 2005).

All the approaches are designed to explain actions that entrepreneurs undertake in order to exploit opportunities through entrepreneurial actions. However, they assumed different entrepreneurial actions to be implemented, with different impact on outcomes. However, in the entrepreneurial literature, the models do not compete. Whereas, it has always been suggested a coexistence of the different methodologies, better suiting some or other situations. It suggests that, they can alternatively been implemented, once understood the type of circumstance (Alvarez & Barney, 2007; Sarasvathy, 2001; Sarasvathy et al., 2003).

The next section focuses on a comparison of these models, exploring differences and similarities between causation, effectuation and entrepreneurial bricolage.

The three approaches are analyzed and compared considering five different aspects: objectives, nature of the entrepreneur, nature of the decision-making context, boundary conditions, process (Alvarez & Barney, 2007; Fisher, 2012).

Objectives. The theories are compared based on the different goals which they base their process on:

- Causal objectives: Opportunities are considered to be created by external shocks, like changes in technology, consumer preferences and political or regulatory changes (Kirzner, 2015). This leads to the consideration that opportunities exist as an objective element. The goal of the entrepreneur is to identify their existence, and exploit the competitive imperfections in order to obtain profit. (Venkataraman, 1997).
- Effectual objectives: Creation theories assume an endogenous view of opportunities, created by unique actions of entrepreneurs during their attempt to create new products and services (Sarasvathy, 2001; Weick, 1979). Opportunities cannot be searched because they do not evolve from pre-existing markets, yet they are social constructs created through entrepreneurial actions and their personal perception. Therefore, there is no clear entrepreneurial goal, but opportunities are created by acting and testing assumption, and shaped by the different path taken in response to variations.
- Bricolage objectives: Similar to the effective theory, the bricolage approach assumes that opportunities do not pre-exist in the market, but they are created out of nothing. They are the result of the entrepreneurs' refusal to enact limitations and their creative reinvention of resources they have at hand (Baker & Nelson, 2005).

Nature of the entrepreneurs. According to the different assumptions of theories, the entrepreneur is expected to have different characteristics.

- Causal entrepreneur: Since opportunities are objective phenomena, all entrepreneurs are expected to be able to recognize them. However, the theory acknowledges that individuals who decide to exploit opportunities are different from the others, explaining why only some individuals are able to exploit them. (Kirzner, 1997; Shane, 2003). This difference is based on a general sense of alertness, influenced by prior knowledge, different risk preferences, cognitive differences.
- Effectual entrepreneur: Before opportunity creation theory, there unique traits of each individual are not considered to distinguish entrepreneurs from non-entrepreneurs. The concept of successful entrepreneurs arises around their uniqueness consideration of who they are, what they have and whom they know, and the idiosyncratic actions that they enact.

- Bricoleur: According to the bricolage approach, the entrepreneur is able to create new opportunities by being able to give new value to resources that have been discarded by other individuals.

Decision-making context. The different theories have been different assumption about the environment within which the individuals make decisions.

- Causation decision-making context: In this approach opportunities are objective phenomena; therefore, the environment is considered risky. This consideration implies that the decision makers can reduce risk by collecting enough useful information to forecast possible outcomes and scenarios and their probability (Alvarez & Barney, 2007).
- Effectuation decision-making context: Opportunities do not already exist in the market along with related information. Hence, the decision-makers are unable to predict the effects of a specific decision. For this reason, the context is considered uncertain. However, it is not excluded that entrepreneurs will still be able to gain partial information about certain action (Alvarez & Barney, 2007).
- Bricolage decision-making context: The context is uncertain, because the bricoleur has no clear goal and is not able to forecast outcomes. It is also penurious, because the decision makers struggle because of scarce resources. The only certain element consist on the resources they have at hand that, combined, can create multiple different scenarios (Fisher, 2012).

Boundary conditions. Since all the three theories refuses neoclassical assumptions of perfect markets, it is recognized boundary conditions, that the entrepreneurial action has to face, exist.

- Causal boundary conditions: Because of its assumptions, the causal approach requires the pre-existence of a market and historic information about it in order to be exploited. Therefore, these circumstances can be considered boundaries themselves that limit the entrepreneurial actions of entrepreneurs.
- Effectual boundary conditions: the fact that the environment is dynamic, nonlinear and not measurable is a constraint for the entrepreneurs. Since opportunities are subjective and socially constructed, entrepreneurs create their constraints through

their actions. Contingencies cannot be avoided or forecasted but entrepreneurs can only learn how to successfully deal with them. Contrary to the causal boundaries, given a priori, in the effectual theory they arise through the creation of the opportunity.

- Bricolage boundary conditions: the most relevant boundary in this theory is the presence of scarce resources in a penurious environment. Entrepreneurs have to find the way to create their opportunity, making do with means they have at hand.

Process. Differences among the three approaches emerge relate to the process through with individuals enact entrepreneurial actions, in their attempt to exploit opportunity and create a new venture.

- Causal process: The causal approach starts from the opportunity recognition, and evaluation. After gathering necessary information, the next step is establishing the goals to exploit the identified opportunity. The entrepreneurs then must to choose among the sets of means that allow them to maximize the expected returns on the product or services introduced in the market. A scheme of the causation approach to entrepreneurship is proposed in the following diagram (Fig. 2) (Shah & Tripsas, 2007).

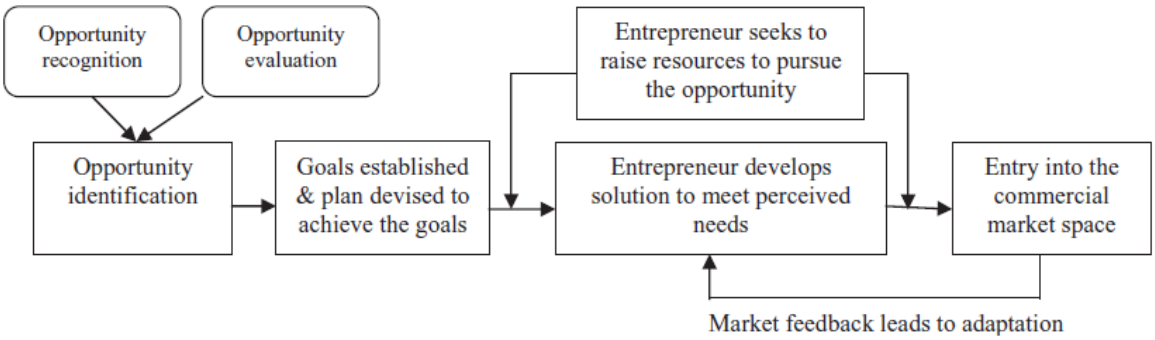

Figure 2: Causation Approach to Entrepreneurship (Shah & Tripsas, 2007)

- Effectual process: This process is based on four key factors: starting with available means, considering affordable loss, leveraging strategic relationship, exploiting contingencies. The entrepreneurs start examinationing who they are, what they know and whom they know, in order to understand what they can do. Through interactions with the environment the entrepreneurs set goals that are not fixed but can change during the process. The process flow is captured in figure 3 (Sarasvathy & Dew, 2005)

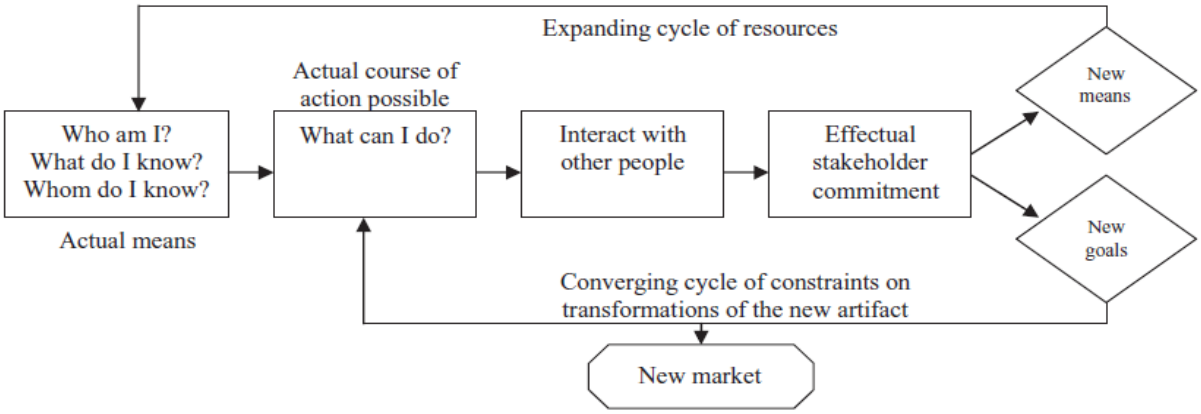

Figure 3: Effectual approach to Entrepreneurship (S. D. Sarasvathy & Dew, 2005)

- <u>Bricolage process</u>: In this approach, the entrepreneur can react to penurious environment in three ways: avoiding challenges, seeking resources, applying bricolage. There are several areas where bricolage apprach can be applied: physical inputs, labor inputs, skills inputs, customer/market, institutional environment. Researches have shown that it is more efficient to apply bricolage only in selected areas and projects (Baker & Nelson, 2005). The process described is shown in figure 4 (Baker & Nelson, 2005).

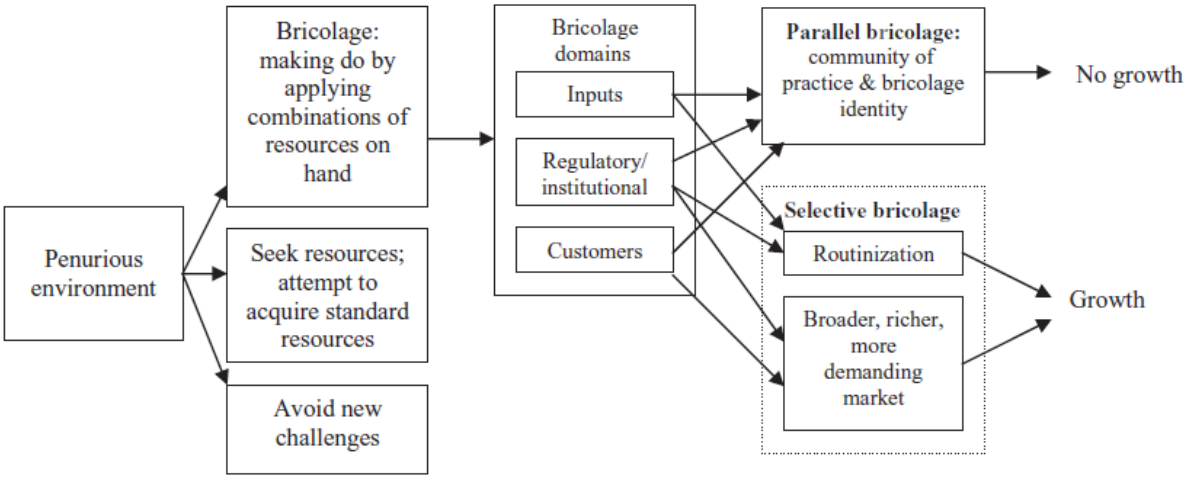

Figure 4: Bricolage Approach to Entrepeneurship (Baker & Nelson, 2005)

1.7.1 Implications for entrepreneurial actions

Even if presenting different assumptions, the three approaches can be considered internally consistent (Alvarez & Barney, 2007).

In several occasions, it has been stated that the different approaches are not overlapping and competing one against the other, yet they can be used to address different circumstances (Alvarez & Barney, 2007; Sarasvathy, 2001; Sarasvathy et al., 2003). In fact, they can be desctibed as context-dependent. The applicability of one approach is strictly connected to the entrepreneurs' assumptions about the nature of the context within they operate. For example, according to the assumptions of each model, a casual/discovery approach can be implemented when the market and concerning information are already available to the entrepreneur, whereas if the market is completely new the use of an effectual approach is suggested.

As a consequence, as Alvarez and Barkey pointed out (2007), it is logical to assume that actions an entrepreneurs must undertake to commercialize their idea, are influenced by the consideration about whether opportunities are created or discovered.

The two authors consider different areas where considering the implications of the different approaches could be useful[1]:

- **Leadership:** Considering opportunity discovery theory, prior knowledge is an important aspect in order to exploit opportunities. For this reason, expert leadership can be assumed to be more relevant and effective. Moreover, leaders already part of a professional environment are more likely to have a broader professional network potentially useful in the exploitation of the opportunity (Shane, 2000).

  On the other hand, expert leadership is an insufficient requirement if cooperation is needed to exploit opportunities. Hence, a charismatic leader is likely to be more effective in creation of opportunities scenarios, thanks to the ability to inspire creativity in an environment with uncertain conditions.

[1] The two authors originally take into consideration the opportunity discovery theory and the opportunity creation theory. In this text we will consider together effectuation and bricolage, since both are based on the consideration that opportunities are created by entrepreneurs.

- **Human resource practices:** In a discovery context, entrepreneurs will have clear information in advance about the resources needed as well as the human capital expertise requested to successfully exploit the opportunity. Therefore, entrepreneurs are able to effectively recruit the knowledge required from a broad audience. On contrary, in a creation context, it is more difficult to predict which type of skills will be needed. For this reason, a flexible recruiting, preferably based on a pre-existing social network, results more useful in uncertain circumstances.
- **Strategy:** In the discovery theories, individuals are provided with enough information that allow them to plan a detailed strategy to better exploit the opportunity discovered. Whereas, in the creation theories, past information are absent and future ones unforecastable. Therefore, a too rigorous planning can be harmful for uncertain situation, limiting the flexibility of entrepreneurial actions. A more flexible emergent strategy can better suit unexpected situation entrepreneurs will face.
- **Finance:** in the discovery context, clear information and detailed strategies create a scenario where information asymmetry can be easily overcome. Entrepreneurs, then, have more chances to obtain financing from external sources. This suggests that the source of capital cost under discovery conditions can be very low. On the other side, in the creation context the situation is the exact contrary, decreasing the chances for entrepreneurs to be financed by external sources. In fact, it will be more likely that entrepreneurs will finance the project with their own funds or with family and friends help.
- **Marketing:** In a discovery context, new products, prices distribution channel and promotion strategies can be better developed and specified, because markets and their information are existing. Customers will have a clear idea of what type of problem the product is solving or what type of need it is satisfying. In a creation context, all these factors cannot be known, since there is no prior information for evaluations. The entrepreneurs can use those elements in order to create and test new hypothesis for new products and services.
- **Sustaining competitive advantage:** According to opportunities discovery assumption, it can be more difficult to sustain competitive advantage in such environment. In fact, information can become easily available to the market, once one or more individuals have exploited a specific opportunity. This can lead to competitive imitation. For this

reason, the erection of entry barriers will be determinant for maintaining the competitive advantage in the market. However, this same aspect does not have the same impact in an opportunity creation context, because of uncertainty that characterizes the environment. In fact, individuals will not be able to recreate the exactly same opportunity, since it is the result of an idiosyncratic path of each entrepreneur. The entrepreneur is likely to gain tacit knowledge during the creation process, that others individual will not be provided with. For this reason, in creation context, competitive advantage will rely more on tacit knowledge rather than entry barriers.

2. The Lean Startup Approach

2.1 Introduction

Inspired by the lean manufacturing principles and Steve Blank's work (2006), Eric Ries developed the Lean Startup Approach (2011). This approach is built on other previous management and product development ideas like lean manufacturing (R. Shah & Ward, 2003), design thinking (Brown, 2008), customer development (Blank 2006), and agile development (Beck et al., 2001).

Lean manufacturing is a management method that define all the expenses for resources that do not produce value for the client, as waste. The core concept of this methodology focuses on the creation of value with the minimum effort.

This method differs from previous practices for what concerns optimization of flows, limitation of wastes, and implementation of empirical methods to analyze what brings value to the production system. The lean concept is at the base of management practices such Total Quality Management and Just in Time. Lean Manufacturing starts with the definition of value from the customer point of view, identifying activities that do not create added value but waste. The final purpose consists of the elimination of such waste that slows down the production, not creating any value for the final customers. This approach's final benefits include reducing waste and production costs, diminishing the production cycle times, reducing supply and storage and increasing productive capacity.

Another approach that shares some core elements with Lean Startup Approach is Design Thinking. It is a design model that can be used to solve complex problems, implementing a creative approach. Through this approach it is possible to use all the business resources, since it allows all the members to contribute to the final solution. The core tools are focused on understanding the customers' and users' point of view, through customer journey examination and interviews aimed at gaining customers insights. This approach triggers a creative and shared generation of ideas, adopting tools such brain storming and mental maps. Rapid experimentation of the ideas is another fundamental element of Design Thinking. Through the realization of prototypes, the validity of the ideated solution is tested.

The other model previously mentioned is Customer Development, described by Steve Blank. This approach consists of four different parts defined as customer discovery, customer validation, customer creation, and company building. The approach guides the entrepreneurs

from the understanding of customers' needs, to the validation and commercialization of their business idea. It has strong connections with the Lean Startup Approach, since it could be considered one of its forerunners. For this reason, it will be further discussed in a dedicated section of this elaborate.

Finally, Agile Development is the other management model that has common features with the Lean Startup Approach. The approach is dedicated to the software development that aims at reducing the risk of failure, by gradually developing the software between iterative time frames. Each frame is considered a small independent project, that includes, at its end, the publication of the software, even if not complete.

The idea is that, iteration after iteration, the product will become closer to customers' requests. At the end of each project the team must reconsider their priorities and objectives. Like other methods, it implements face to face communication with customers in order to obtain insights and feedback. The final objective is creating a product that satisfies customers' needs, reducing initial costs and development time, while increasing the quality of the software itself.

Therefore, as description of these methods suggest, the purpose to eliminate waste of time and resources and to reduce the uncertainty, that characterize the decision-making process, is common to all of them, as well as to Lean Startup Approach.

It is possible to understand the reason of the development of such ideas by looking back at the period when they were introduced.

According to Blank's explanation[2], most of these approaches were developed as a consequence of the 2000 Dot-Com crash. During those years, startups were receiving huge investments and were focusing all their attention in writing business plans, generating five years forecasts and looking for First Movers advantages. Little understanding of the customers and of the business model was the ongoing practice, with consequentially over estimated expectations and high burn rates. The before mentioned approaches arose because of the necessity of a process focused on customers understanding and flexible product development process, reducing changes costs to reach the product-market fit. Lean thinking applied to startups gave origins to methods that help entrepreneurs to identify the business model hypotheses and to test them with customers in the market (Blank 2013), through a continuous

[2]S. Blank, "Is the Lean Startup dead?", September 2018, https://steveblank.com/2018/09/05/is-the-lean-startup-dead/

and incremental product development process. The following step is creating a Minimal Viable Product and introduce it to a large number of customers in order to get immediate feedbacks. This process allows founders to prove if their assumptions are wrong and gives them time to pivot without investing excessive amounts of resources and time in an unsatisfying product.
In fact, the Lean Startup approach is created with the aim of reducing the waste in product and business development processes in startups. The approach is enriched with tools and concepts that push entrepreneurs to validate their assumptions and stop activities that produce no value, encouraging those that do (Frederiksen & Brem, 2017).
Then, overcoming the uncertainty that characterizes the startups journey towards the product-market fit is another objective of the Lean Startup Approach. Startups operate in a highly uncertain environment where the new products demand is characterized by high variability. According to the author, this approach can help entrepreneurs to perceive and resolve that uncertainty (Ries 2011) thanks to the application of a validated learning. This concept consists in a process of demonstrating through empirical data that the startup is based on valuable hypothesis and evidence-based assumptions, reducing the likelihood of biased subjective considerations and early failure.

2.2 The Lean Startup process

According to Ries (2011, p. 27), «a startup is a human institution designed to create a new product or service under condition of extreme uncertainty». Entrepreneurs face a situation where the future is unpredictable, and the pace of change is always increasing. Thus, startups cannot be considered as a small version of a corporate business, because while the second one's objective is to operate a business model, the startup goal is yet to find a sustainable one. Ries' approach is, then, a tool that aims at helping the startups at finding their business model in the most effective way with the least waste of resources.
Eisenmann, Ries and Dillard (2013) developed a process that synthesizes the Lean Startup phases. It consists of six steps that the entrepreneur shall follow in order to employ the Build Measure Learn loop in the quickest and most effective way.

The process is organized in the following way:

- Envision Phase: in this stage the entrepreneurs develop their vision and their hypothesis about product idea and business model. This stage has two steps:
    - 1. Set a vision
    - 2. Translate vision into falsifiable hypothesis
- Build Phase: the entrepreneurs put into practice their ideas and test them in the field, to gain customers feedbacks and data. This stage is divided in the following steps:
    - 3. Specify MVP tests
    - 4. Prioritize tests
- Measure Phase: during this phase the entrepreneurs are asked to collect feedbacks and data and to draw learning milestones from them. The step which is composed of is:
    - 5. Run tests and learn from them
- Learn Phase: In this phase the entrepreneurs find out if the initial hypotheses are validated or rejected.
- Decide phase: based on the validated learning, the entrepreneurs can decide whether to persevere with the idea if hypotheses are validated, pivot or perish if hypotheses are rejected.

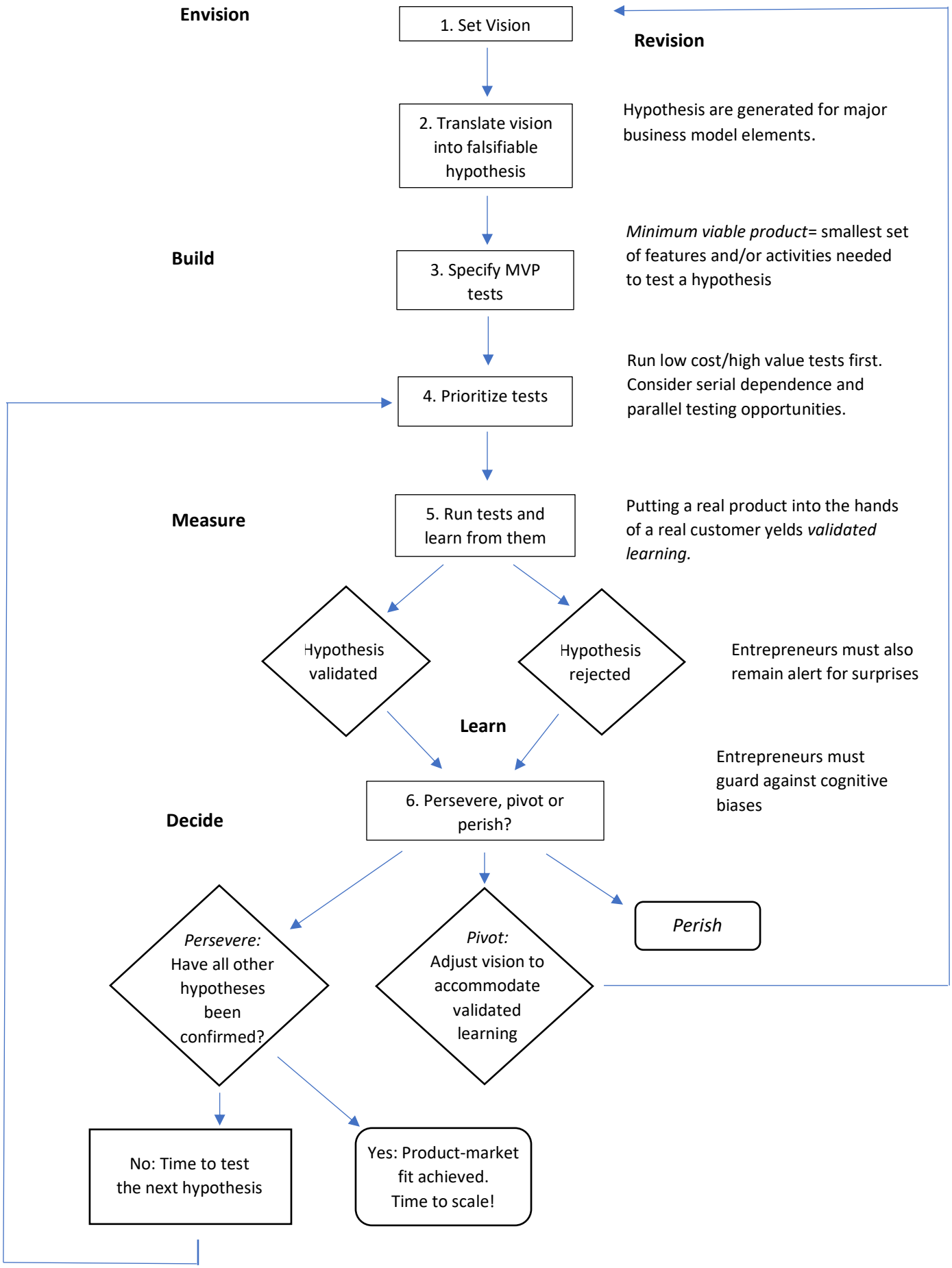

Figure 5: The lean startup process (Eisenmann, Ries and Dillard (2013)

2.2.1 Build Measure Learn cycle

The Build Measure Learn cycle (fig. 6) represents the central part of the Lean Startup Approach. According to Ries (2011), this loop is what best represents the journey each startup goes through, while looking for a business model. Starting from the idea, the startup creates products. These products are presented in the market and, when customers interact with them, they generate feedback and data. These feedbacks can be both qualitative, if the test is oriented, for example, at understanding whether customers liked the product or not, and quantitative, if tests are focused on gathering information about how many people used the product and found it valuable.

At this point, the distinguishing element is that Lean Startup Approach helps the entrepreneur to minimize the total time spent to complete the loop, in order to reach a product-market fit, avoiding the waste of time and resources. Thanks to the Build Measure Learn loop the entrepreneur can obtain validated learning and verify the previously set hypothesis, on which the entire business model is based. In order to achieve this, the first step is entering the Build phase as quickly as possible with an early version of the product, the minimum viable product (MVP). After creating the MVP, the startup can approach the Measure phase. In this phase, the entrepreneur collects data and feedback and analyzes them to understand whether the product development efforts are leading to real processes. The method suggested by the author is called Innovation Accounting. During the Learn phase, the entrepreneur uses processed information to generate learning milestone, which are an alternative to traditional business and product milestones. They are useful to entrepreneurs for assessing their progress accurately and objectively. The Build Measure Learn loop allows the entrepreneurs to quickly understand if the initial hypotheses are wrong and, in case, to effectively adjust their strategy. The learning leads to a deeper understanding thanks of the validation of the customer, the problem and the market (Müller & Thoring, 2012).

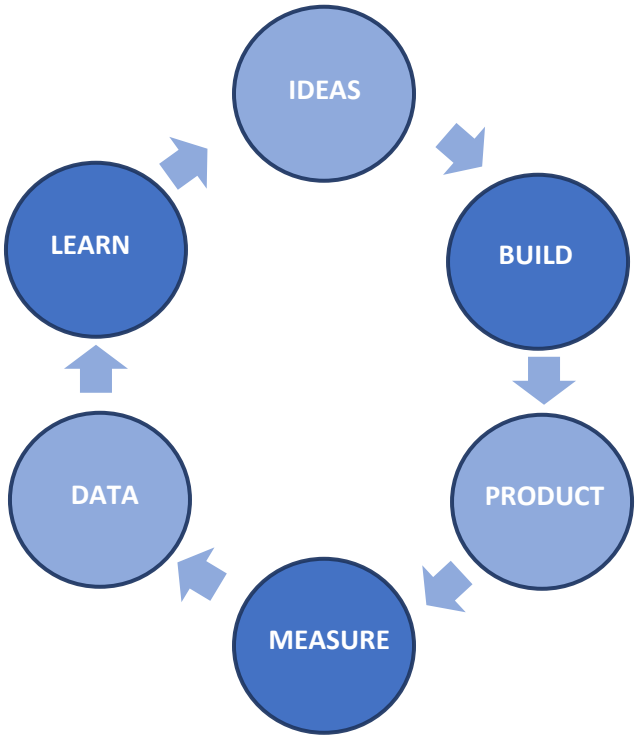

Figure 6: Build-Measure-Learn Loop

2.2.2 Hypotheses

Ries (2011) identifies two main reasons why startups fail. The first behavior, that limits the startup flexibility, includes adoption of a rigid plan, implementation of a solid strategy and thorough market researches. On another hand, the second element is the application of the "Just do it" methodology, refusing any managerial approach, with an early but unplanned entrance in the market. Ries' solution lies in the middle of the two extremes, developing an iterative but structured approach.

The first step is defining the startup Vision, understanding who the entrepreneur is and defining the startup. The entrepreneurs must understand the problem the startup will address and the potential solution. Starting from this central vision the entrepreneurs shall, then, break it down into two components, considered the main business hypotheses that are supposed to be tested to be validated.

The first one, the **value hypothesis**, assesses whether a product or a service delivers an added

value to the customers who use it, satisfying a recognized need of the market. It tests the business model of the startup as well as the features of the product.

Then, the second hypothesis is the **growth hypothesis**. It tests how entrepreneurs can scale the number of customers attracted to their product or service.

These hypotheses must reflect two characteristics, in order to be able to create validated learning (Eisenmann, Ries, & Dillard, 2012). A hypothesis must be falsifiable, which means it can be rejected through the experiment. The absence of this trait will increase the possibility to succeed with the experiment, yet it will limit the chances to obtain validated learning. In addition, hypotheses must be comprehensive: entrepreneurs have to recognize that some assumptions are intertwined with each other and it is not possible to analyze them, if others are not addressed first.

Once one or several hypotheses have been established, they can be tested by conducting several experiments.

2.2.3 Minimum Viable Product (MVP)

The best way to accelerate learning is to launch early and often (Eisenmann et al., 2012).

Even though traditional market research techniques such as focus group and customer surveys have been largely implemented in the past (Kotler & Keller, 2006), entrepreneurs are more likely to obtain reliable feedback when introducing a real product or a prototype version of it in the market, making them available customer to use it and evaluate it.

In fact, one of the most crucial and innovative concept in Ries' book (2011) is the Minimum Viable Product (MVP).

As defined by Ries (2011, p. 77) the MVP is «a version of the product that enables a full turn of the Build-Measure-Learn loop with a minimum amount of effort and the least amount of development time».

According to Lenarduzzi & Taibi (2016), the concept and the definition of MVP is not the same in the whole literature that followed Ries' book, instead, it mutates depending on authors' personal interpretation. For example, according to Björk, Ljungblad and Bosch (2013, p.23) «the MVP is typically the first version of a product released to customers, and should contain only the absolute minimum in term of features and design for it to become viable to the customer». In general, the most recurrent concept describes the MVP as a minimum set of

functionalities and features necessary to allow the product to be deployed, gather customer feedback and be test in the market. “Minimum” is the key word in the definitions and it can be interpreted as minimum effort, minimum requirements, minimum possible implementation, minimum value organization (Björk et al., 2013).

To summarize the MVP concept, it is possible to note that it does not have to be a product, but it needs to be the easiest version of the product that allows the entrepreneurs to obtain validate learning (Ries, 2011).

Moreover, unlike prototypes and concept tests, the objective of the MVP is to test the fundamental business model hypotheses and not only the product design or other technical questions (Ghezzi, 2018; Ries, 2011).

For this reason, it does not need numerous complicated features, but those features appealing to early adopters. Therefore, it is useless to produce a high-quality MVP, because it is still unknown who the customers are, and investing in too many uncertain features could lead to resource waste. On the other hand, however, it is true that the MVP can sometimes be perceived as low quality. However, entrepreneurs can exploit these findings to understand which characteristics customers care about, keeping the cash burn rate at the minimum. Therefore, it is relevant to notice that the MVP is not a low quality partial version of the final idea, it is just a simplified version that aims at testing the core idea, as the figure 7 shows (Brinker, 2016).

As pointed out earlier, the MPV sometimes it not a real product. In fact, the smallest and simplest MPV can take the form of a smoke test, which is the name to describe MVPs for products not yet developed (Eisenmann 2013). For digital startups, sometimes, the MVP can consist of a landing page through which the entrepreneurs can collect customers email addresses as a legally non-binding letter of intent. Another option available to entrepreneurs is creating a video MVP. In this case, the MVP consists in a video where the functions and characteristics of the products are explained. This option is useful when the risk of developing an unsuccessful MVP is too high. This is what Dropbox did, since it is a very complex product to build. Hence, its founder, Drew Houston, created a first prototype that, however, was not ready to be tested by many people. So, he recorded a video showing the main feature of his prototype. The video obtained lots of views and was useful to validate the main business hypothesis.

Most of the time, many MVPs will be launched in order to validate learning and obtain incremental knowledge. These iterative feedbacks will lead to better chances to obtain a successful product-market fit, or to the understanding that there is no need in the market for that product.

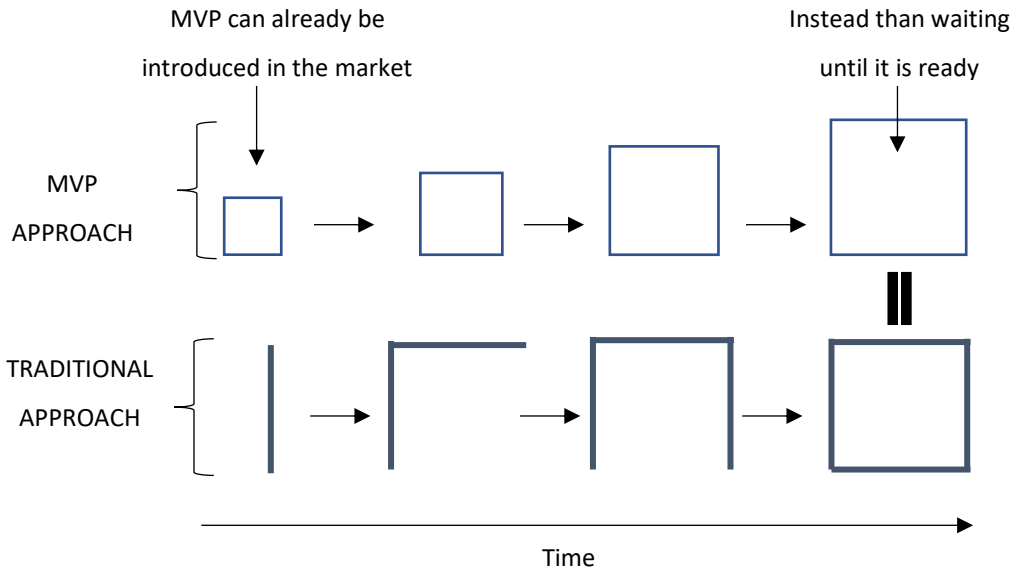

Figure 7: Conceptual visualization of the MVP idea (Brinker, 2016)

2.2.4 Pivot

After completing the Build-Measure-Learn loop, the entrepreneurs must recognize if the assumed business model is validated or not, considering three potential choices for their next step: persevere, pivot or perish (Eisenmann et al., 2012; Ries, 2011).

If the entrepreneurs observe that their business model hypotheses are valid, and the core strategic idea sustainable, then, they can continue on that path and prepare to scale. This does not necessarily imply that every aspect will remain unchanged, because entrepreneurs are always asked to continuously question parts of their business model through Build-Measure-Learn loops.

Differently, if the crucial business model hypotheses are rejected, and the entrepreneurs cannot identify any other possible solution, the option is to abandon the business idea.

The third option is the pivot. Ries (2011, p. 149) defines the pivot as «a structured course correction designed to test a new fundamental hypothesis about the product, strategy, and

engine of growth». At this point, the entrepreneurs have discovered new information about the market and the customers that induce them to change their assumptions.

The pivot cannot be thought as a simple change that entrepreneurs decide to implement. This tool is a correction used to lead changes in the business model and to create new fundamental assumptions, triggering a new Build-Measure-Learn cycle. This does not entail that entrepreneurs will ignore what done until that moment, because all the validated elements, consistent with the new hypotheses, are maintained to guide and execute the pivot (Ries, 2011).

The pivot is an important tool that entrepreneurs should use in order to avoid the waste of resources. Moreover, its continuous implementation is acknowledged to be a crucial aspect to achieve success (Bajwa, Wang, Duc, & Abrahamsson, 2016). Thus, even after a company achieved initial success, it must continue to pivot, in order to exploit new opportunities or enlarge the size of the covered market.

However, clear statements about the degree of innovativeness, that the pivot must have in order to be considered a pivot, are not available. It could be valued as incremental decisions based on daily actions (Hirvikoski, 2014), while it is also seen as a radical change that revolutionizes how users and customers were targeted before the pivot (Bosch & van der Veen, 2013).

Ries (2011) identifies several types of pivot that entrepreneurs can enact, according to the different information that they have been able to collect.

Ten types of pivot are taken into consideration in the Lean Startup Approach:

- Zoom-in Pivot: the entrepreneurs realize that customers are interested only in a specific feature rather than in the whole product. In this case the single aspect can be implemented in a whole new product.
- Zoom-out Pivot: It occurs when the product features are considered not sufficient to address customer needs and, for this reason, the whole product becomes a single feature of a broader product.
- Customer Segment Pivot: When trying to validate their initial assumptions, entrepreneurs discover that their product can be targeted to a different customer segment, not taken into consideration before.

- Customer Need Pivot: Entrepreneurs find out that the problem they are trying to solve is not that relevant to their customers. However, during the tests, they are able to identify concerning or completely new problems that they could solve, modifying their existing product or creating a completely new one.
- Platform Pivot: This pivot is more likely to occur in digital and software products. It verifies when there is a change from a platform to an application or vice versa.
- Business Architecture Pivot: Based on the idea that companies generally implement business architecture built on high margin and low volume or low margin and high volume (Moore, 2007), this pivot happens when entrepreneurs change their business architecture.
- Value Capture Pivot: It implies changing the way that the startup captures value, changing its revenue model.
- Engine of Growth Pivot: Through this pivot, the entrepreneurs change significantly their growth strategy in order to grow faster and more profitably.
- Chanel Pivot: This pivot happens when the entrepreneurs recognize that there are more valuable and effective channels to deliver their solution to customers.
- Technology Pivot: The entrepreneurs discover a new technology that can be implemented to deliver the same solution to the same customers.

The factors that can trigger a pivot are several. The most common cause of pivot is usually negative customer feedback (Bajwa et al., 2016). However, other aspects, like failure to compete with competitors, founder's decision, lack of team competences, emergence of new technology, technology limitations or even bad luck can be added to the list.

Pivots are common during businesses' life, YouTube, for example, did not start as the video streaming platform known today. It started, instead, as a video-based dating service, where users could upload videos about themselves. The founders decided to pivot when they noticed that users were making a wider and funnier use of the platform, until it slowly turned itself in the well-known video-sharing website.

An example of technology pivot is Nintendo. It started as a playing card company in 1880's. However, when the playing card market started falling, Nintendo explored different directions to continue its business. Eventually, attracted by the growing popularity of the sector, it decided to pivot in the toy and gaming market.

2.2.5 Innovation Accounting

During this process of obtaining validated learning, another crucial aspect is the measurement of results obtained through testing. However, startups are not smaller versions of established companies, therefore standard accounting may result inefficient and unreliable to evaluate a startup results, because of their unpredictability.

To indulge this circumstance, Ries (2011) introduces a method called Innovation Accounting that shall enable startup to understand if the startup is making any progress and to objectively prove their sustainability, based on metrics coherent with startup nature.

The Innovation Accounting consists of three steps or "learning milestones". In a first place the company has to establish a baseline, though an MVP, by measuring real data on the situation which the startup is facing. Secondly, there is the step called "Tuning the engine", where the startup adopts micro changes in order to move towards the ideal product, starting from the current situation. In this phase, every action that the startup undertakes, may it be product development or marketing, has to focus on improving the growth model. Finally, the third step is a decision point, where the startup must decide whether to pivot, persevere or perish.

As stated before, measurement is a crucial aspect of Innovation Accounting. However, in order to have reliable data, Ries advocates to abandon the so called "vanity metrics". Such metrics are misleading data consideration, based on favorable numbers that are unreliable to prove whether the company is experiencing great progress. In alternative, the suggested metrics are the called "actionable metrics", used to judge the business and the learning milestones. These metrics, in order to be considered actionable must show a clear causa-effect nexus, allowing the entrepreneurs to understand which actions should be repeated to replicate the results. Contrariwise, metrics that cannot respect that criteria are labelled as vanity metrics. For example, using the number of customers of a certain product is not sufficient enough to prove the sustainability of the business model. Instead, the Innovation Accounting approach suggests using cohort analysis and split-tests. With those tools, the entrepreneurs should try to understand how different customers segments approach and interact with the product rather than just focusing on gross numbers like total revenues. For example, if the startup offers an online service, the analyses should address to investigate the percentage of people who registered but did not log in, the users that engaged with the service for more than a specified number of times and, finally, those who paid for a premium version of the service.

In this way, entrepreneurs are able to understand at which point of the growth path the startup is, without being deviated by distorted metrics.

2.3 Limits of the methodology

Even if this methodology appears as a universal approach that could be implemented by any startup, researches and existing literatures have identified some limitations that could affect its successful implementation.
Some limitation, identified and taken into consideration in the analysis, will be explored in the next section.

Product/market characteristics

Eisenmann et al (2012) suggest that the Lean Startup could lead to fewer advantages, if applied in some situations. Such situations can be related to particular characteristics of the market, where the product is introduced, or singularities of the product development itself.
For example, it could result difficult to implement this approach in situations where mistakes cannot be tolerated.
Considering that the core idea of the approach is the use of minimum viable products that could offer low quality performances, its application might be inconvenient when the possibility to correct potential mistakes is not available, once launched the product.
In the same way, the approach might not be an effective alternative when mistakes in the product development could have significant impacts on customers' mission-critical activities.
Limitations of its application can sometimes be linked to limited societal, and sometimes even legal, tolerance for mistakes, as for example in the case of new pharmaceuticals development.
Moreover, another situation when the use of the Lean Startup Approach can result limited or less effective, is when demand uncertainty is low. When an unsatisfied section of the market demand is clearly recognized, feedback about customers' needs may result less useful, since the entrepreneurs is already aware of the unsatisfied need.
Finally, another scenario occurs when high demand uncertainty and long development cycles result in the impossibility to launch early and often. In fact, radically new products often require engineering breakthroughs and massive infrastructure deployment. In such situation, early prototyping cannot be used to overcome customers uncertainty. However, it is still suggested to use a hypothesis-based approach to gain insights on target customers' needs.

Experimenting risks

The Lean Startup Approach core element is experimentation through an MVP, that can help the entrepreneurs to obtain validated learning. However, several risks connected to experimentation have been identified.

Despite the advantages that MVP can offer to entrepreneurs, the potential exposure to idea theft cannot be ignored by entrepreneurs (Contigiani & Levinthal, 2018; Eisenmann et al., 2012). It should be warning especially for environments characterized by weak intellectual property protection, low appropriability regimes, and high possibility of learning from experiments of other companies (Teece, 1986). In these situations, entrepreneurs must be careful, even though, the importance of understanding potential customer should not be overshadowed by potential competitors intimidations. (Eisenmann et al., 2012).

In addition, experimentation could also lead to reputational costs (Contigiani & Levinthal, 2018; Eisenmann et al., 2012). Since the MVP, by definition, has a minimum set of features, it could offer poor performances and create a negative idea of the product among early adopters. If the negative reaction would spread, it could create a general adverse reputational impact. In this situation, it might be useful to launch the MVP using a different brand name in order to diminish reputational rick, by avoiding the negative association with the current brand of the product.

It is important to consider that continue experimentation could harm the startup organizational structure as well. Changes might be most of the time expensive, and they can also have a moral impact on the components of the team that could feel demotivated by the continue redirection of the efforts (Contigiani & Levinthal, 2018).

False positives/negatives

When entrepreneurs evaluate results from MVP testing, they should be aware of the possibility to obtain false positive and false negative (Eisenmann et al., 2012; Ladd, 2016; Maurya, 2012).

A false positive occurs when the hypotheses have been confirmed by customers' feedback, but they are not actually valid. This implies that the customer acquisition approach will not be able to scale, and it will not be possible to replicate the positive results in the future. These false positives can happen sometimes when the MVP is tested through enthusiast individuals who do not represent the final target customers of the startup.

On the other hand, a false negative happens when hypotheses are not confirmed, even if valid. In this case, potentially good ideas can be mistakenly discarded because of the negative feedbacks. This can happen because the approach does not set clear rules about when the entrepreneurs should stop testing and start scaling. Moreover, this situation also occurs when the entrepreneurs present radical innovative products that might not be understood by the customers. In this case, entrepreneurs with a clearer and stronger vision of their product and of the benefit they can bring into the market, will have better chances to overcome this bias and succeed.

In general, the entrepreneurs must be very careful whilst interpreting the results of the testing and, in addition, it is suggested to run multiple tests in order to gain more data and reduce biases.

Customer Adoption risks

Some authors also underlined potential negative effects of including customers and users in early stages of experimentation.

Yordanova (2018), in her research, points out that the users involvement in the experimentation process could limit the ability of obtaining breakthrough and radical innovation. Past researches also underlined the fact that users' involvement is better suited for incremental innovation. For this reason, it is not likely that radical innovations development processes will include users or customers in the research design (Lynn, Morone, & Paulson, 1996).

According to Yordonova (2018), because of their bounded rationality, and national-cultural specifics (Lüthje, Herstatt, & Von Hippel, 2005), involving customers in the early stage of product development could be harmful for the company and could lead to the exclusion of radically innovative ideas.

Moreover, the effect of cognitive dissonance is another factor that limits users' ability to objectively evaluate a product. In fact, because of their inexperience, people tend to evaluate new situation based on past experiences (Zanna & Cooper, 1974). It is important, in addition, when testing a product with customers, to consider the limited capability of individuals to adapt to new situations, and their tendency to stick to their traditional point of view (Arnon & Kreitler, 1984).

Researches show that entrepreneurs still tend to apply the Lean Startup Methodology in a strict methodic way, despite their awareness of potential limitation. The result is that they experience, for this reason, fewer breakthrough and radical innovations (Yordanova, 2018).
In addition, customers feedback can be negative also because of their impact on entrepreneurs themselves, when they heavily rely on them. As a matter of fact, receiving too many negative feedbacks from customers could be harmful for entrepreneurs. Moreover, keeping changing the project so frequently might cause them to lose their vision and their determination (Ladd, 2016; Mansoori, 2017).

Cognitive Biases

Entrepreneurs should be aware of some other biases while implementing the Lean Startup Approach. Cognitive biases have to be included in the analysis of the Lean Startup Approach, since they are linked with the ability to assume objective considerations from received feedbacks (Eisenmann et al., 2012).
In fact, most of the time, entrepreneurs, because of a lack of information, tend to rely on intuition, which can be considered a fast, automatic, effortless, and emotional decision making process (Stanovich & West, 2000). Thus, frequently entrepreneurs rely on subjective and scarce information to enact entrepreneurial activities, which expose them to several biases and heuristics (Eisenmann et al., 2012; York & Danes, 2014):

- Selection bias: Is the tendency of entrepreneurs to gather data among friends, family or sources recognized to positively support their hypothesis.
- Optimism bias: Even if optimism has been proven to be a positive trigger of entrepreneurship, sometimes it can lead the entrepreneur to ignore significant relevant elements (Kahneman & Egan, 2011). Therefore, the entrepreneurs can become so optimistic about their idea that they to ignore disconfirming data.
- Acquiescence bias: It verifies when, during interviews with individuals, they indulge entrepreneurs' ideas, rather than offering their subjective and honest feedback,
- Representativeness bias: This bias occurs when results from a small sample are used to deduce general assumptions. Unfortunately, it is not always possible for entrepreneurs to test their hypotheses with a large number of customers. For this

reason, they have to take into consideration that the data collected within a small audience might be compromised.

- Overconfidence bias: Similarly to optimism, overconfidence might be useful to entrepreneurs in some occasions to overcome environment uncertainty (Koellinger, Minniti, & Schade, 2007). However, this tendency to overestimate their knowledge and abilities could lead them to nonobjective considerations of their idea, limiting their capacity to analyze data. The result is being stuck with an unsuccessful product.
- Confirmation bias: It is the tendency of individuals to interpret information by paying attention only to information that confirm their beliefs. This could cause to obtain false positive results.
- Planning fallacy: it consists on the tendency of individuals to overestimate benefits of an action and underestimate its costs in terms of resources, time and risk. In order to reduce its impact, it could be helpful to have the fallacy in mind, when making assumptions, and compare other projects with the ongoing one.
- Sunk cost fallacy: Sometimes individuals tend to consider past expenses that cannot be recovered, when making evaluations about a new project. Therefore, entrepreneurs may become attached to current situations, declining to pivot, because they do not want to waste resources invested until that moment.

2.4 Customer Development

When developing the Lean Startup Approach, Ries was influenced by the work of his mentor Steve Blank, the author of the Customer Development approach. The two methods, built to help entrepreneurs to develop their startups, have similar approaches and assumptions. This consideration enable their adoption within the same framework, implementing them in a complementary way (Ghezzi & Cavallo, 2018).

Customer Development is a concept introduced by Steve Blank (2005). The approach is a four-step framework that guides the entrepreneurs through the research for a sustainable business model. The journey includes discovering and validating the best market for their business idea, identifying the product features that can solve customers' problem most efficiently, testing the correct model for acquiring customers and developing a structured organization around the validated business idea.

This approach was developed starting from the considerations of the limits of the product development. In fact, Blank denounces the fact that the approach, based on a sequential scheme of concept development, product development, testing, and launch, was incomplete to assure a successful introduction of a new product in the market.

The approach lacked a point of view focused on customer needs, giving more attention to the product features. On the contrary, hence, Blank offers a cyclic approach based on the understanding of customer needs. He recognized the importance of entrepreneurial intuition and he placed it in a formal process that could have limited the uncertainty of the startup environment (York & Danes, 2014). Other researches as well promote the inclusion of customers in the early stage of the product development, as a key aspect to explain the success of some products compared to others (Henard & Szymanski, 2001). Moreover, also the concept of linearity of the product development approach has been rejected by other authors, observing that, instead, communication and decision-making processes follow a more circular, nonlinear, and non-sequential journey (Koen, 2004).

The Customer Development is based on the idea that startups are organizations that do not possess a defined business model and their goal is yet to find a sustainable one (Blank, 2013; Ghezzi, 2018). Blank suggests that it is important to consider startups differences, since some may approach an existing market with a new product while others might introduce a new product in a new market. However, most of the time, startups have not a clear idea of the type of customers their product will serve. In fact, this is the premise where the Customer Development approach starts from. It tries to offer a guide through steps, focused on learning about customers and the market, not covered by the product development process.

However, it has not established itself as a substitution of the product development process. The two approaches can be implemented in a complementary way, offering insights about customer needs that can be used in the features development (Blank, 2013).

As anticipated before, the approach includes four steps: Customer Discovery, Customer Validation, Customer Creation, Company Building (Fig. 8). The steps can be further paired forming two macro-steps. The first one is dedicated to the search and it includes Customer Discovery and Validation, while the second one is focused on the execution and includes the Customer Creation and Company Building.

Each step is considered iterative, and it implicitly states that before moving to the third and fourth stage the startups will probably have to go through several iterations while defining

their target market. The core idea is that startups, instead of developing products and services, should develop customers (Ghezzi, 2018).

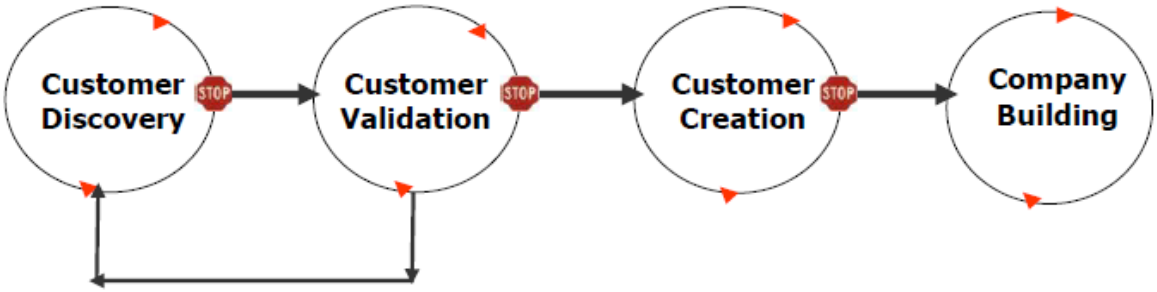

Figure 8: The Customer Fig 8: Development Process (Blank, 2013)

Customer Discovery

Customer Discovery is the first step startups face. Its goal is to understand who the potential customers for the new product are, and to understand if the product solves a problem people are interested in.

During this stage, entrepreneurs might comprehend that the hypothetical customers of their vision are not consistent with customers they find in the market

The most important concept, in this stage, is "getting out of the building". Entrepreneurs have to get out of their offices and create a direct relationship with potential customers, in order to talk with them and obtain valuable insights. This concept has been implemented also by other authors to develop their approaches (Maurya, 2012; Ries, 2011). This is a delicate and difficult part that should be implemented by founders themselves, in order to understand if their vision can be valid or not. In this phase, it is not important to talk to all people, and to understand all the needs of all potential customers.

It likely occurs that the product, in the initial part of its life, will be designed only for few individuals, rather than for a mass-market. It is necessary then to quickly identify the optimal product/market fit, understanding which are the most valuable customers that could help the product to grow in the market. Such customers are identified as Earlyvangelists (Blank, 2013) and consist of that part of customers that will be willing to take a risk on the startup's product

or services. Unlike other customers, earlyvangelists accept to buy an unfinished product, because they are able to envision the problem and the solution provided by the product.

Earlyvangelists have some common characteristics: they have a problem or a need; they understand they have a problem; they are actively looking for a solution with a certain time constraint; the problem is so urgent that they managed to find a temporary solution; they can easily offer money to buy a product or a service that could satisfy their need (Blank & Dorf, 2012) (Fig.9).

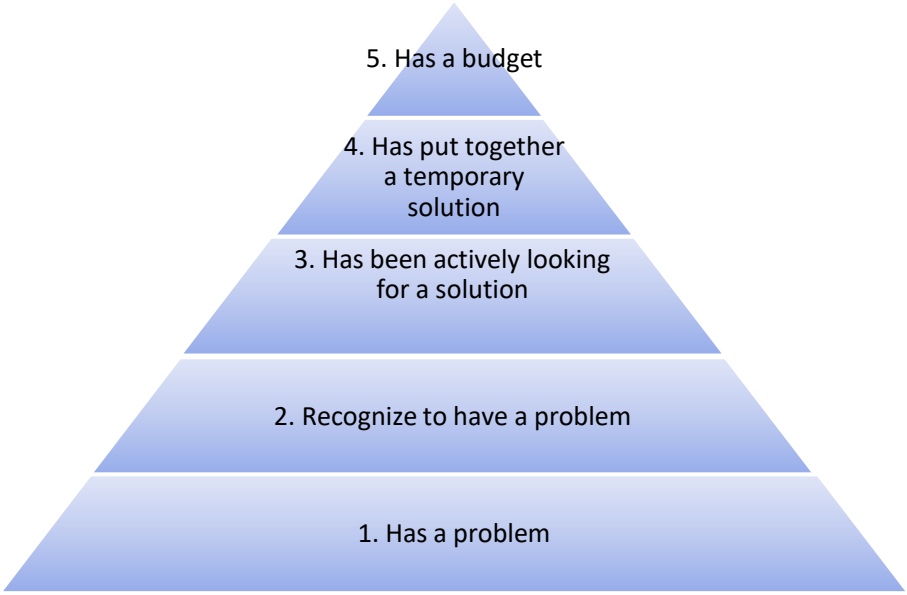

Figure 9:Evangerlists (Black & Dorf, 2012)

Entrepreneurs should, in particular, focus on the two last steps of the pyramid that describe the individuals more likely to become earlyvangelists.

Once identified the potential customers, the next step is trying to transfer their business vision in a written document through the business model canvas (Osterwalder & Pigneur, 2010). After having stated the hypotheses with the business model canvas, the entrepreneurs have to test them, verifying whether their assumptions are wrong or right. In this way, entrepreneurs can gain a deeper understanding of their business, their customers and which characteristics the product needs to satisfy them. After having tested the problem, the approach suggests testing if the solution provided works in the market and if customers are willing to pay for it.

Customer Validation

Once problem and solution have been validated and potential customers identified, the startups need to validate assumptions about how to sell the products or services (Blank & Dorf, 2012). Thus, the goal of this stage is to build a repeatable model of sales and marketing that will be later implemented in the scaling phase.

The finalization of these two steps, Customer Discovery and Customer Validation, is useful to build a repeatable and sustainable business model. The entrepreneurs will have to switch among the two steps until they have found a validated customer segment and a repeatable sales process, before moving to the next execution stage.

Starting from the validated areas of the business model, the first step is creating a sales roadmap and preparing marketing activities to get ready to sell. Early scaling is one of the most common mistakes startups incur in. For this reason, it is necessary to prioritize what entrepreneurs want to validate first.

The next step is getting out of the building again to meet potential customers and verify if assumptions about the revenue model are correct.

The most rational thing is trying to sell the product to earlyvangelists, considering that if they are not willing to pay, it is unlikely that other customers will. Getting feedback, at this point of the cycle, helps entrepreneurs verify whether their business model is repeatable, scalable, and sustainable. After this point, entrepreneurs must analyze their results and understand if they have to go back and test new assumptions or if they are ready to scale their business.

Customer Creation

This phase follows when entrepreneurs have had their first sale. It is important to underline that this step may vary in relation with the different types of startups, considering for example if they are entering a new or an existing market.

The stage is focused on directing sales and marketing actions beyond the earlyvangelists and the first customers, with the objective of creating an end-user demand.

Company building

This is the last part of the Customer Development approach, entrepreneurs have validated their assumptions and discovered a sustainable business model. In this stage the goal is, then, to transform the current organization into a structured company.

The startup abandons its informal structure and it moves towards mission-oriented departments dedicated to each section of the business model.

2.4 Entrepreneurial theories and Lean Startup Approach

According to Ries (2011), a startup is defined as an organization of people that operates in an environment characterized by uncertainty, whose goal is, not to implement a business model, yet to find a repeatable and sustainable one.

The aim of the Lean Startup Approach is to resolve uncertainty through the adoption of a validating learning loop that empirically helps the entrepreneurs in gaining information about the startup environment and customers (Ladd & Kendall, 2017).

This concept of environmental uncertainty is common to other entrepreneurial theories, like for example the effectuation model developed by Sarasvathy (2001). According to this methodology, the entrepreneurs have to deal with an uncertain environment that stop them from implementing rational planning. Therefore, effectuation suggests that entrepreneurs have unlimited potential opportunities to implement, and, for this reason, they do not have to operate with a profit maximization perspective but rather acting in a way that allows them to create more possible future options (Yang, Sun, & Zhao, 2018). This consideration implies the adoption of explorative activities by the entrepreneurs, aimed at testing, trying, experimenting their entrepreneurial assumption through an iterative process.

Ries' approach, that has become popular because of its easy comprehension and practical orientation, focuses its crucial and most characterizing aspect on the validation of the initial startup's business model and early adopters.

In fact, the Lean Startup Approach focuses on the idea of experimenting and getting customer feedback through the implementation of a minimum viable product.

The idea that entrepreneurs formulate their own assumptions about future of the startup recalls elements of the opportunity creation theories (Ghezzi, 2018). Entrepreneurs, during the implementation of this approach, shape and create their own unique business that is an idiosyncratic result of their vision and the resources implemented.

The aspect of iterative attempt-and-trial implementation is common to different approaches explored in this dissertation. It is embedded with the Lean Startup definition of validated learning loop. It can be observed in the effectuation model, enclosed in its concept of

entrepreneurial acts as non-forecasted actions but instead as ability to control and use future contingencies. Finally, it is included in the ability to making do with resources at hand, contemplated by the Entrepreneurial Bricolage.

Concerning the three approaches is then the focus on experimenting using the limited resources available to the entrepreneurs that allow them to quickly have a feedback from the market and the customers about the feasibility of their assumed business model. This step gives the entrepreneurs the opportunity to analyze the results and, in case, change their path accordingly.

Another aspect that can be found in the three approaches is the idea of implementing a successful business idea, limiting the use of economic resources. In the effectuation model there is the idea of the affordable loss, which is the economical and budgeting consideration that should guide the entrepreneurs during their decisions. In the same way, the entrepreneurial bricolage considers the idea of making do with resources at hand as an element of entrepreneurial success, which implies that the entrepreneurs, thanks to their intuition and ability, will be able to keep expenses low and optimize the use of their resources.

The connection between the Lean Startup Approach and the effectuation model has been introduced by several researches (Bortolini, Nogueira Cortimiglia, Danilevicz, & Ghezzi, 2018; Frederiksen & Brem, 2017; Ladd & Kendall, 2017; Yang et al., 2018), even if it has never been deeply systematically analyzed (Ghezzi, 2018).

The interesting aspect is observing how two approaches, coming from different backgrounds, academic one for the Effectuation Model and, instead, a more practical one for the Lean Startup Approach, have similar assumptions and lead to a similar concept of entrepreneurial activity. In particular, both the model work around the idea that entrepreneurial facts follow an iterative process, need external validation and need early prototyping.

The Lean Startup Approach has been extensively adopted because, thanks to its iterative testing and feedback analysis, it helps entrepreneurs to validate their initial assumptions and business hypothesis. This is an important aspect because it lets entrepreneurs gain information that they did not have before, since they did not have clear ideas or plans about the future possibilities. Now instead, after implementing the Lean Startup Approach entrepreneurs have been able to understand the business hypotheses that their business model is built on.

Once identified, the environment swifts from uncertain to risky, where variables are identified, and it is now possible to collect reliable information. This consideration leads to the idea of a two stages itinerary that startups face while trying to develop a successful business idea, going through a first stage of searching, while they are verifying their assumptions, and a stage of executing, once they have been verified and a more structured plan has been implemented.

This idea of breakdown was already present in the Customer Development approach, according to which, the customer discovery and the customer validation stages are considered the parts of a searching phase, while the consumer creation and company building stages are part of an execution phase (Blank & Dorf, 2012). Moreover, other following researches have explored this concept and have given their own interpretation.

For example Yang, Li Sun and Zhao (2018), while examining the entrepreneurial cognition behind the Lean Startup Approach suggest the existence of behavioral difference of startups finding themselves in a search stage and those in an execution stage. In fact, because of intrinsic differences in circumstances and actions implemented, the search stage is more coherent to an effectuation approach while the execution phase, characterized by risky but not uncertain assumptions, is more suitable with the causal approach.

The idea that the two approaches were complementary and not one a substitute of the other was always taken into consideration by previous researches and contributions (Fisher, 2012; Sarasvathy et al., 2003). However, even if before they were considered different approaches for different situations, it has never been considered that they could have been two steps of a same journey.

In the same scope, a consistent and complementary idea is brought out by De noble and Zoller (2017), in their research about the utility of the traditional business plan in the actual entrepreneurial theory. They state that the implementation of a static business model is not feasible because of the environmental dynamicity the startups are exposed to. However, they recognize a potential use of a more agile and dynamic version of the traditional tool in parallel with the lean startup approach, during the exploitation phase of the startups.

To conclude, according to the literature analyzed, it is interesting to notice that both the Lean Startup Approach and the Effectuation Model, define the entrepreneurship embedded with uncertainty, which is a difficult aspect that has to be solved or limited by entrepreneurs. It is relevant to note that both models, even if having different background and applications,

recognize that relevant to this aspect is having an iterative approach that tests and validates the business idea in an adaptive way.

3. Empirical research

3.1 Method

This chapter will introduce the empirical research that investigated the aspects brought up by the analysis of the literature. The empirical research is addressed at exploring any similarity and correlation between aspects of the theories on entrepreneurial opportunity and elements of the Lean Startup Approach. The second objective, then, is researching the practical use of the approach to assess potentiality and limits, offering a comparison between theoretical and empirical elements.

This study is based on a qualitative research design with qualitative semi-structured interviews on a sample of startups and mentors working in incubators/accelerators.

The startups have been identified based on the list of the best Italian startups, according to Startupitalia[3] and Wired[4]. Some startups were selected based on the affinity of their business model with the applicability of the Lean Startup Approach. For example, startups with pharmaceutical of biomedical business models were excluded according to the applicability limitation related to such type of startups. Then, they were contacted with an email, and the ones that showed interest in the research were interviewed with a telephone interview.

The incubators have been identified in a similar way. First of all, a general research on research engine has been conducted. Then, after being listed, some of them that were more reliable with the possible environment of application of the approach, have been emailed. Two phone interviews and two face to face interviews were held.

In both cases, with startups and mentors of incubators the questions used aimed at investigating several aspects of the research. First of all, it was asked if the interviewer knew and ever used the approach, then depending on their answer a different set of questions was used. If they did not used the approach the questions were aimed at understanding their journey towards a sustainable business model, investigating in particular if they applied some of the tools of the approach, like MVP, users interaction, and pivot, without actually adopting the approach in an open, aware and meticulous way. The objective was understanding if parts

[3] StartupItalia, "La Top100! Le migliori startup italiane del 2017, secondo noi", December 2017, https://startupitalia.eu/82900-20171218-sios17-top100-startup-italia-2017

[4] A. Carnevale, "50 startup italiane di successo da tenere d'occhio", May 2018, https://www.wired.it/economia/start-up/2018/05/21/50-startup-italia-successo/

of the Lean Startup Approach were spontaneously and intuitively adopted by startups even if the approach has not been implemented.

Differently, if the interviewers said they already used the approach, the questions were oriented at understanding the implementation of the approach with focuses on the use of MVP, Pivot, and users interviews. The objective was to understand how the startups and the mentors learned about the approach and how they experienced the adoption. Then, the questions were also oriented at understanding whether limits and benefits analyzed through the literature were observable in the practice as well.

Moreover, the interviews were addressed at understanding a second element carried out by this research. As a matter of fact, the goal of this research is also trying to find links between the Effectual Model by Sarasvathy and the application of the Lean Startup Approach. For this reason, as stated in the previous chapter, after the theoretical reviews, a hypothesis has been advanced, which consider that the Lean Startup Approach is a tool used by startups in the search phase, associated with the effectual model. In fact, it could be helpful for startups to convert the environment from uncertain to risky, making the entrance to the execution face, associated with the causal model, easier. It is also suggested that in this second phase startups might find useful the adoption of a more flexible and revisited version of the business plan.

Thus, in order to investigate these aspects, another set of questions was proposed to all the startups and incubators/accelerators.

The questions were created in order to identify if the situation and the approach, used by the startups, had the peculiarity and the elements that characterize the effectuation model. In particular, it was investigated their approach to planning, their approach to the customer segment identification, the development of their business idea, their allocation of budget, their perception of the risk and uncertainty, use of stakeholder networks and partners relationships, reactions to contingencies and attitude towards future events.

All these elements were used to identify and describe the situation startups faced at the beginning of their business and at the moment when the business was considered more stable and structured.

By carrying out qualitative interviews, it was possible to generalize more firmly the hypotheses arisen from the theoretical analysis, and it resulted useful to give better insights to the research. Therefore, the semi-structured interviews were the primary source of information when collecting data in this research.

The empirical results of the interviews were interpreted using the information and the knowledge gained from the analysis of the Lean Startup Approach available literature and the entrepreneurial literature about the opportunity theory, in particular the one related to the causal and effectual entrepreneurial models.

The role of the interviewers has been crucial in the finalization of the elaborate. It allowed to get into the details of the journey startups have to go through while looking for a sustainable business model and the practical implementation of the Lean Startup Approach, observing closely adaptation's difficulties and its perceived benefits. Moreover, this step was essential to strengthening of the theoretical analysis, that was enriched of an empirical point of view.

3.2 Startups and Incubators/accelerators

The paragraph introduces all the startups, incubators and accelerators that have contributed to the empirical part of this research. In particular, the interviews were held with founders of the four startups, with the Innovation Consultor at M31, the Community and Events Manager at Nana Bianca, the Innovation Project Manager at H-farm and a Mentor of Impact Hub.

3.2.1 Startups

Carepy

Carepy S.R.L is an innovative startup founded in Bari, Italy, in 2014 by Davide Sirago, Luigi Brigida and Alessio Germinario. On year 2017, the startup counts one employee and it produced 23.510€[5] revenues. Carepy is a multi-platformed application that help users managing their own and their family members therapies, keeping track of medicine consumption, medicine purchase, and medical exams, connecting them with their general practitioners and pharmacists. The mobile application offers daily assistance to families in their medicine management, and, at the same time, it helps general practitioners to follow their patients' treatment records, and it is a tool for pharmacists to maintain customers loyalty. The idea comes from a personal experience of one of the founders who had to follow a relative's treatment. He noticed the lack of an tool that could help him to keep tracking it

[5] Source: Aida, Italian companies database: https://aida.bvdinfo.com

and, because of its informatic background, he decided to create his own one. The app is currently available in the Italian market. Carepy won several prizes because of its innovative idea: best “Innovation in Pharmacy” in 2015, “National Prize for Service Innovation” in 2016, “Prize of Prizes in Innovation” in 2016, prize “AboutPharma Digital Award” in 2017.

Midori

Midori S.R.L. is an innovative startup founded in 2011 by Christian Camarda and hosted at the Innovative Companies Incubator of the Polytechnic University of Turin. At the end of 2017, the company has 5 employees and has accumulated 140.803€[6] revenues. The startup sells a smart meter, Ned, that allows customers to track and manage energetic consumption in their home. The product can detect and recognize each appliance’s “electric print”, analyze and categorize them, offering a detailed analysis of what each domestic product is consuming.

The project has started as a University research project and became a business in 2014, the first prototype has been released in the market in 2018. They collaborate with high-profile national and international companies, and they are oriented to a B2B and a B2C market.

Awhy

Awhy is an innovative startup founded in Bologna, Italy, in 2015 by Nabil Arafin and Emanuele Pucci. At the end of year 2016 Awhy counted one employee working in the company and it produced 21.080€[7] revenues. The startup innovates the customer care, offering an automated chatbot that can answer companies’ clients 24 hours per each day of the week. Awhy implements both artificial intelligence and machine learning in a smart, self- learning software.

After winning the Tim WCup in 2015, they started developing the first prototypes and launched the product online in 2016. In the same year they joined Barcamper Accelerator for a three months accelerator program. They are now accelerated in Nana Bianca Accelerator. After targeting small medium enterprises, their target market in now oriented to big companies.

[6] Source: Aida database, computerized analysis of Italian companies: https://aida.bvdinfo.com

[7] Source: Aida database, computerized analysis of Italian companies: https://aida.bvdinfo.com

Clairy Inc.

Clairy is an innovative startup operating in the air purifying industry founded in San Francisco by Paolo Ganis, Alessio D'Andrea and Vincenzo Vitiello. Since 2015, it operates in Italy, in Pordenone and Milan, under the name of Laboratori Fabrici S.R.L, it counts 13 employees and, at the end of 2017, had 330.497€[8] revenues.

Their two products, Clairy and Natede, are designed to amplify the purification powers of plants to eliminate indoor air pollution. In addition, customers can track the pollution level thanks to a dedicated mobile app and a monitoring system equipped with last generation sensors. Born form an Industrial Design thesis, the first prototype has been launched at CES 2016, in Las Vegas. The startup has, then, been incubated in the Silicon Valley incubator Plug and Play for a three-month period. After that, the product has been launched on Kickstarter, raising 250.000 €, selling in 52 countries. Its second product, Natede, was launched on Kickstarted in April 2018. In the 2016 Clairy won the European Design Award, and in 2017 Natede project won the "Horizon 2020" European Commission call for tender.

Name	**Location**	**Year of foundation**	**N. of employees (at 2017)**	**Revenues (at 2017)**
Carepy	Bari	2014	1	23.510€
Midori	Turin	2011	5	140.803€
Awhy	Bologna	2015	1	21.080€
Clairy	Pordenone/Milan	2015	13	330.497€

Table 1: Startups

3.2.2 Incubators

M31

M31 is an Italian accelerator, based in Padua, Italy. It starts operating in 2010, and on year 2017, it counted 34 employees and 2.813.191€[9] revenues.

They work with research centers, startups and technology companies to innovate in several sectors. In particular, their work is focused on systems and disposals that analyze and measure

[8] Source: Aida database, computerized analysis of Italian companies: https://aida.bvdinfo.com
[9] Source: Aida database, computerized analysis of Italian companies: https://aida.bvdinfo.com

human beings' actions and gestures; on automation like cyber-physic systems and their application in manufacturing companies; on human-machine interfaces. Their portfolio counts eight projects. The interview was held with the Innovation Consultor.

Nana Bianca

Nana Bianca is an Italian accelerator, founded in Florence, Italy, in 2008. At the end of 2017 it counted 8 employees, with 2.324.541€[10] revenues.

Nana Bianca offers a coworking space, where are hosted 40 startups. In addition, it offers a four-month acceleration program where they select 5 startups per round, offering 20.000€ per startup, giving them the opportunity to collaborate with 25 mentors. During this period, Nana Bianca helps startups finding their business model, building a minimum viable product, analyzing their key performance indicators, preparing startups for their entrance in the market, finding new investors, and scaling up.

At the moment their portfolio includes 31 active projects of startups focused on web services, advertising, e-commerce, IOT, and mobile app.

During the research, the Community and Events manager was interviewed.

H-farm

H-farm, founded in Treviso, Italy, in 2005. At the end of 2017, it had 159 employees and it produces 32.914.223€[11] revenues. It is an innovation hub that offers acceleration programs for digital startup, innovation consulting programs for big companies and education courses about digital transformation.

Currently, their business is focused on strategy innovation culture programs, where they help companies innovating their business processes, finding new organizational mindsets. Moreover, they design, develop and manage technological solutions to support companies' innovation processes, they also offer digital marketing assistance, and they help companies with brand innovation and artificial intelligence.

For what concerns the startup acceleration program, at the moment their portfolio includes four digital startups.

The interviews, part of this research, was held with the Innovation Project Manager.

[10] Source: Aida database, computerized analysis of Italian companies: https://aida.bvdinfo.com
[11] Source: Aida database, computerized analysis of Italian companies: https://aida.bvdinfo.com

Impact Hub Milano

Impact hub Milano in an innovation hub based in Milan. Operative since 2009, it counted 6 employees and it had 714.046€[12] revenues at the end of 2017.

Impact hub offers a coworking space that counts more than 300 people. In addition, it offers standard and customized incubation program to sustainable and high society-impact startups. It offers a 6 months program where they offer mentors support and guide the startup from the concept idea to the market launch.

The hub currently hosts 10 startups and it incubates 5 startups, with a total of 100 hosted/incubated startups since 2012.

Name	**Location**	**Year of foundation**	**N. of employees (at 2017)**	**Revenues (at 2017)**
M31	Padua	2010	34	2.813.191€
Nana Bianca	Florence	2008	8	2.324.541€
H-farm	Treviso	2005	159	32.914.223€
Impact Hub Milano	Milan	2009	6	714.046€

Table 2: Incubators/accelerators

3.3 Results

The results are presented as qualitative findings derived from semi-structured interviews conducted with four startups and four startup mentors.

The identified startups are four of the best performing Italian startups, and the four mentors are individuals working in four different Italian incubators and accelerators. The startups come from different fields of implementation, from medical to energetic, and the products taken into consideration are both software and hardware. In some cases, one single product is composed of both versions. For what concerns the incubators, they have different characteristics as well, some of them are focused on digital startups while other in hardware technologies.

[12] Source: Aida database, computerized analysis of Italian companies: https://aida.bvdinfo.com

The results obtained from the interviews are aggregated around five main research questions addressed in this study. In particular four of them are aimed at analyzing implementation of the Lean Startups Approach and some of its tools, and the last one is focused on understanding the link between the approach and the other entrepreneurial theories and tools, analyzed in previous sections.

3.3.1 Lean Startup Adoption

A first part of the interviews was focused on the examining whether the startups or the mentors knew about the Lean Startup Approach and whether they adopted it while developing their business or helping startups during that phase. The interviewers explained their personal experience about the use of this method and they were asked about potentialities and limits they encountered during its application. It has been investigated why they decided to apply it, and which they consider the perceived benefits, and, on the other hand, which problems or difficulties they found related to this approach, based on their experience.

All the interviewers, from both startups and incubators side, were familiar with the approach. All the startups interviewed confirmed they have used it during their search for a sustainable business model. All the mentors working in incubators/accelerators confirmed that the Lean Startup Approach is validated approach that they use to help startup finding their product-market fit or growing their business, in more advanced stages.

Either startups and mentors decided to apply this approach because of several recurrent benefits and positive aspects. For example, the application of this approach encourages flexibility in the startup development, which is decisive for innovative projects that have no previous market to analyze and are continuously exposed to changes of the external environment. The founder of Midori - a startups focused on a product with both hardware and software elements that offers a monitoring service on energetic house consumption-states:

> « This tool is necessary to be flexible and to change direction quickly. If you have an innovative product like ours, there are no other similar products on the market or reference that you can base your ideas on. You need to make

> hypotheses on the customers' needs and on the answers to these needs. Then, they must be validated somehow, because the risk is to having solutions for a need that is not considered important or offering a product that does not solve the right problem.».

Moreover, another positive side of this approach is that it helps reducing the financial and monetary risk because it is useful not to use an excessive amount of monetary resources to validate the business idea. It is also helpful to reduce the investment risk because it helps entrepreneurs identifying elements that before were uncertain. It has been observed that the approach is used for this reason also in more advanced stages of the startups, as, for example, the founder of Awhy said, they never make huge investments without having validated them before.

This idea is especially linked with the formulation of an MVP. This tool allows entrepreneurs to test their idea without having huge expenses to develop a complete product. For example, during interviews, from startups and mentors experience it has emerged that most of the time startups do not offer a real product to customers in order to test it. In some cases, startups have presented fake boxes that pretended to be real products in order to collect feedbacks from people, since creating a real prototype was too expensive, and they decided to create a functioning one only when they were more certain about its value. In the same way the Innovation project manager in H-farm says that:

> «Our idea is that the MVP even if not working, should test the idea. For example, if you have to test a marketplace you do not need to develop a complete platform, you can just use a Facebook group to validate people's interest».

The idea that this approach is useful to test the business idea in a less expensive way is spread among the startups environment and it can be considerably helpful in those cases when the startups is built around a complex hardware technology instead than a digital product. In fact, the Innovation consultor of another M31 accelerator states:

> «Creating an MVP can help to validate the idea in a less expensive way, because building a physical finished product can cost up to more than thousands of Euros, whilst building a digital MVP is way cheaper».

In addition, it has been observed that the approach helps startups to have a deeper understanding of the business around the single product, instead of just focusing on the technical part of it, and it encourages them to organize and prioritize the ideas. This aspect has emerged, in particular, while talking with the mentor of the Impact Hub. He claims that:

> «The startup environment is risky, and there are uncertainties about the business and the ideas evaluation. The Lean Startup Approach is a method that helps startups to think 360° about the business and not just about the idea, since some of them do not have this type of managerial background. It helps startups, especially in the early stage, to prioritize ideas and reflect about the nature of their product. Moreover, it is useful to create a pitch analyzing all the elements in a structured manner».

In general, the data have shown that startups tend to use the approach during several stages, and not only in the early stage. The founder of Awhy says that they keep using the approach, even if not implemented in a structural way as before, now it is used in a selective way to validate integrations and new ideas before investing on them. In the same way, the founder of Clairy discloses his attempt to continuously apply the lean idea to several aspects of the startups like for example to the execution and to the finance. A similar element is observed from the incubators and accelerators point of view as the Community manager of Nana Bianca points out that the approach is used in a continuous way during the life of startups, not only at the beginning of the business. The mentor of Impact Hub expresses the same idea while considering:

> «It can be applied in all the stages of the startups. For example, we are now working with startups in an advanced stage with products already introduced in the market that are now trying to introduce new ideas, that have to be restructured and tested».

The approach is positively considered also because of its intuitive nature and its coherence with startups nature. For example, H-farm has always applied a similar approach even before the Lean Startup Approach, because it has always been oriented to testing the product in the real market in order to understand its potentiality. The Community manager of Nana Bianca expresses similar considerations, stating that it is in the nature of the startups to test their product, all the digital startups they worked with use A/B tests to verify which functions are working and which are not.

The founder of Clairy as well shows similar tendency to assume that it is intrinsic with the instinct of the entrepreneur:

> «The Lean Startup Approach is something logic and intuitive that entrepreneurs have always used, now it has just been academically structured».

However, slightly different considerations have emerged during the interview with M31. In fact, the Innovation Consultant has observed that not all the entrepreneurs are open to testing their product because they consider their idea and assumptions strong enough. Therefore, especially in the view of this consideration, the approach results helpful to bring the product outside the startup. According to the founder of Midori, this is a crucial element for the success of the product:

> «When the product remains too long in the development team, it reaches such a saturation level and we are not able to have objective considerations. For this reason, it is essential to bring it out in the market, to let people test it. It helped us to grow quickly. The improvement we had in one year was much bigger than what we had in the previous years when the product was not tested».

On the other hand, during the interviews, some difficulties linked with the application of the approach have emerged.

Three startups out of four have pointed out that, even if the approach is easy to understand, the practical part can be difficult in some parts and its application differs depending on the type of project.

For example, according to the founder of Carepy, applying the Lean Startup Approach is not easy for people who have not done it before. In particular, difficulties have been encountered on a managerial point of view, it was difficult to create a product that had the minimum features necessary to be used, to respect deadlines and, especially for developers, to adapt to the idea of not completing all the functionalities. In general, it required a more complicated organization of the work. It was a matter of time to get used to the new organization but, finally, it has become easier. Nevertheless, he says that his team and he might not have exploited all the benefits of this method also because at the beginning of the startup they could not find a mentor or an expert who could have guided them during the whole process.

Similarly, the founder of Midori says:

> «There is an experimental approach to this method. The application of a method is complicated, you need a structured training, specific to your context, because every startup is different. Having a mentor who helps you to understand what you are doing and if you are doing it in the correct way is crucial. In a seminary this cannot happen, in that way we learn about the approach but not how to implement it».

For example, in order to include a new function, he explains, according to the theory, it is necessary to test it with the users to validate the hypothesis. However, even such a simple task like creating a questionnaire can be tricky because it is important to consider which are the right questions to ask in order to avoid biases and to identify who to send the survey to. If entrepreneurs do not have the expertise these activities might be really time consuming and entrepreneurs might question the utility of the method. In fact, also the founder of Awhy points out that sometimes it is challenging to determine the path to follow and to guide the whole team towards that vision.

Interviews with incubators and accelerators have led to different considerations. Most of them were not connected to the application of the method itself but with the reaction or the attitude of the entrepreneurs to it.

For example, the Innovation Consultor at M31, based on its experience, tells that he noticed that sometimes it is difficult for entrepreneurs to adapt to the new approach because they are sure about their ideas and they do not see the benefits in testing them. This same consideration has been observed by the Innovation Project Manager in H-farm who says:

> «The response to the approach depends on people culture. Not everyone is able to handle repetitive trials and failure before succeeding. Some entrepreneurs want to make things in a proper way since the beginning and for this reason they need more time. However, it is really personal».

Moreover, another aspect, confirmed by both M31 and the mentor at Impact Hub, is that startups can be overwhelmed by external information and it could be difficult to prioritize them. For example, the mentor of Impact Hub says:

> «Most of the time, when there are negative feedbacks or suggestions, the tendency of the founders is to try to solve all the problems, but our role is to help them understanding which information take into consideration».

This last consideration leads to another negative aspect that has been brought up by the mentor. In fact, ending up in a vicious loop is a recognized risk of a naive application of the approach. In this scenario entrepreneurs keep testing every single aspect, considerably delaying the entrance in the market, consuming both time and economic resources. In fact, he explains, it is important to apply the approach but it necessary to consider that it is just a help, it is not a solution to all the problems a startup can face during the launch of a product. According to the Innovation Consultor in M31, another difficulty related to the approach, is that for entrepreneurs can be difficult to accept that their product and their idea are questioned. In fact, in the same scope, the Innovation Project Manager in H-farm identified the most crucial aspect of the approach in the ability to transform the negative feedback in something positive.

To conclude, it is possible to notice that the problems identified by startups differ from the ones identified by incubator and accelerators. In the first case, in fact, difficulties are more related to practical steps of the approach that are easy to understand but tricky to be

implemented in the practice without a guide or without having experience about the approach. On the other hand, incubators have not shown such type of problems, that, instead, are related to the attitude of entrepreneurs.

It can be assumed that since incubators and accelerators have experienced the application of this approach more times are able to adopt it in a more confident way and are able to implement it in an objective way since they have no emotional attachment to the product. In fact, this last consideration can assume a relevant weight because entrepreneurs might sometimes lose objectiveness about the project and risk to fall into a non-ending, time-consuming loop.

Pros	**Cons**
Useful for innovative products	Managerial difficulties to implement it
It encourages flexibility	Lack of a guide during application
It helps test the market	Exposure to too much information
It allows testing the product without huge investments of money	Difficulties on how to transform negative feedback into positive considerations
Deeper analysis of the product and its business	Inability of entrepreneurs to adapt to the approach
Coherent with startups nature	Risk of eternal iteration

Table 3: Pros and Cons

3.3.2 Minimum Viable Product

Few questions were also formulated in order to get insights about the Minimum Viable Product. For example, during interviews with startups it has been investigated how they approached and used this tool, which criteria they used to identify the minimum features to test, and further questions about how they managed potential negative feedbacks. It has also been questioned if they know about the possibility of having false negative/positives and how they manage that risk. The objective was to understand how the tool of the MVP is implemented and which are the difficulties that entrepreneurs find during its creation. Similar

questions were dedicated to incubators and accelerators, and some more were aimed at understanding the attitudes of entrepreneurs toward this tool and their role, as incubators and accelerators, during its development.

Moreover, another goal of the questions was to understand if in real situations biases evidenced in the theory could be spotted in the practical application.

First of all, the data gathered confirm the MVP being one of the most important and crucial aspect of the Lean Startup Approach. All the startups stated they have used it and all the incubators/accelerators always include its creation during the training and mentoring period. It is considered a useful and important tool because it allows entrepreneurs to test their ideas in an economic and fast way.

The approach to the MVP is generally progressive in order to obtain validation with the minimum use of resources. For example, the founder of Carepy explains that they did not start with tests of the complete product in all the three platforms, the patients one, the pharmacists one and the doctors one. They just started with the patients one to see if the idea was positively accepted by the market, before proceeding with the implementation of the other two. At the same time, two other incubators suggest that the first version of the MVP in some cases is not even a working product, it can consist of an empty box or just a landing page of the physical product. The important aspect is that it conveys the idea of value proposition that the product can offer. Once enough positive feedbacks have been gathered, economic resources and time can be used to produce a more realistic version.

Minimum features

The aspect concerning the choice of the minimum features to test through the MVP, after a theoretical overview of the Lean Startup Approach, demanded further investigation.

In this case, the issue concerns the ability of entrepreneurs to identify those features that minimize the use of resources to develop them, whilst at the same time best representing the value proposition of the product. To investigate this aspect, questions were addressed to the interviewers about how they chose the features to test – in the case of startups – and how they usually help startups to identify them – in the case of incubators and accelerators.

The results obtained show that there is no uniform way of doing it, even if some approaches are recurrent.

A first option is selecting the minimum features based on feedback from the external environment. For example, the founder of Carepy explains that they tried to understand which functionalities were more valued and useful through phone interviews for a first evaluation. In a second moment, for further adjustments they used to collect feedback from their early adopters, having also face to face interviews with a pull of selected users, to validate those functionalities.

In a similar way, the team of Midori decided which elements to implement through survey campaigns, to understand which were the more appealing characteristics to potential customers. They started with a first campaign with 100 people asking them which were the most liked features and then they built the first MVP with two of those. Therefore, after a confrontation with the potential customers the choice was taken internally, choosing from options obtained from the market, considering at the same time development and technology limitations. The incubator M31 follows a similar approach. According to the Innovation Consultor the external feedbacks are a constant element on the development of MVPs. They usually develop the work based on weekly sprint, with divergent and convergent parts. They start with a proposal from the entrepreneur and then they discuss it during brainstorming, until they converge to a second idea, based on real data. At the end they come up with a clear and concise definition of MVP. In every step there are feedbacks from the market, at the beginning the entrepreneurs talk with friends and family and then they start talking with people from the network of the incubator.

On the other hand, there is also an approach completely different where features are internally discussed. For example, the Community Manager at Nana Bianca explains that, during the four months training period, they help entrepreneurs developing their MVP starting from their idea and then discussing about it with their mentors and the founders of Nana Bianca. Some entrepreneurs decide to include potential customers since the first moment, like for example a startup, that is developing a platform for associations, decided to ask directly to some associations which features they considered more useful. Therefore, this journey depends on the attitude of startups as well, Nana Bianca do not impose a method, but they guide entrepreneurs in their choices.

A similar approach was used by the founder of Clairy:

> «When I analyzed the market, I analyzed the competitors and their products, so we decided to use the minimum features useful to understand what the product could do, for example the use of ceramic and the presence of particular sensors. The only thing we added later and that was requested by people in Kickstarter was the self-watering system».

In this case, features were decided internally but then feedbacks and suggestions from the market were taken into consideration and implemented.

Early adopters

Another element that was considered interesting to investigate in how startups identify the early adopter to test the MVP. Since in the theoretical approach there are no references to this part, it could be useful to see how individuals implemented it.

Some evidences have emerged. Four elements were consistently taken into consideration by startups and incubator/accelerators: existing network, partner, fairs, Kickstarter and social media.

Several interviewers assert that the first step towards the identification is talking with family and friends in order to test the potentiality and limits of the idea and to try to enlarge their network. The network has been considered a crucial aspect especially in two cases. For example, the founder of Awhy explained that the initial early adopters were companies that were part of the network of their accelerator, that has helped them in this identification process. In the same way, the Innovation Consultor at M31 claims that this process most of the time becomes easier thanks to the big and diversified network they have developed during the year. Most of their startups are able to test their products with early adopters thanks to their contacts.

Another way to find early adopters common to more startups is presenting their prototype at fairs. In fact, a lot of time is spent to research and identify the most suitable fairs for their needs. For example, Carepy attended a pharmaceutical fair where they presented their product and they also won a prize that helped them to continue with the project. The most emblematic example is the one of Clairy. The founder had clear ideas:

> «I liked the idea and we decided to attend the CES in Las Vegas, that is the place you have to be if you have a new technological hardware product. So, we created a first prototype with a low budget and we went to Las Vegas to see if our product could have an impact in such an important fair».

That was a winning decision because after the fair, Plug and Play Ventures offered to accelerate them for three months.

The identification of early adopter through partner has been observed to be another effective approach. Thanks to partnership, Midori has been able to avoid time consuming B2C researches, reducing the exposure of an incomplete product to the market. In their case, they contacted 4/5 companies that were related to their product and sold them some prototypes. The employees of the companies had to test them and report feedbacks and opinions. However, there are some risks that the founder explains:

> «The risk is that those companies are not ready for a prototype and they instead expected a complete product. This can lead to a loss of a useful contact. On the other hand, it is important if the companies testing the product are paying, because they are more interested in giving you constructive critics».

Another way of identifying early adopters is offering the product to the market so that they can start buying it before it is produced.

For example, according to the Innovation Consultor at M31, Kickstarter is considered a useful platform to obtain early adopters, especially for hardware products, which production require a bigger investment of money. In addition, the platform was used by Clairy as well. In fact, the founder confirms:

> «Our trial by fire was Kickstarter, because in the platform people invest money and they are not willing to do that if they are not interested in what you are offering. That was the leanest part, selling a product that has not been produced yet».

The pre-sale of the product is considered an effective way to gather early adopters that show proactive interest in the product. The mentor of the Impact Hub shares the same opinion, even if he finds this key aspect in another tool. According to him, the social media are a useful mean, that allow entrepreneurs to promote their product through posts, ads and pre-sales, and observe the reaction of people. He states:

> «Some people just like the post, some other leave comments or order pre-sales. When you see that there are enthusiastic feedbacks, you can start establishing a constructive dialogue, and it allows you to identify a category of early adopters».

In general, from data gathered it has emerged that usually startups have a general idea of what their target market could be, and they work toward that guideline. At the same time, entrepreneurs have shown to be open to change their idea and shift to a new target when necessary. For example, as the Community Manager at Nana Bianca tells, one of their startups selling English workshops for children targeting mainly families, has now shifted towards a b2b orientation, selling their workshop to resorts.

Name	**Approach**
Carepy	Friends, family, fairs.
Midori	Friends, family, Partners
Awhy	Friends, family, Accelerator's Network
Clairy	Friends, family, Fair, Kickstarter,
M31	Friends, family, Network, Kickstarter
H-farm	Friends, family, Market
Nana Bianca	Friends, family, Market
Impact Hub	Friends, family, Social Media

Table 4: Early adopters' identification

Critical issues in Lean Startup Approach

During the interview part of the questions were related with the investigation of potential difficulties or negative aspects that the interviewers indirectly or directly observed.

In particular, it was interesting to investigate whether the critical issues identified during the theoretical research were perceived by individuals during the launch of the MVPs, or on contrary, if there were some aspects that are present in the practice but not considered by the theory.

The questions were articulated around three main issues: **users inclusion bias** (Yordanova, 2018, Ladd, 2016; Mansoori, 2017), **false positives/negatives** (Eisenmann et al., 2012; Ladd, 2016; Maurya, 2012), **experimenting risks** (Contigiani & Levinthal, 2018; Eisenmann et al., 2012).

For what concerns the first aspect, it has been investigated the reactions of entrepreneurs and their idea about external negative feedbacks and how they manage to balance them with their vision, and, in the case of incubators/accelerators, which was their role in this journey.

All the interviewers have expressed their familiarity with negative feedbacks, after tests startups always collect negative opinions about their product.

According to the interviewed startups, this aspect is mostly accepted as a necessary step. All the four entrepreneurs were aware of the possibility of obtaining negative feedbacks by the customers or users, and they were conscious that even if it is difficult and challenging it is a mandatory situation to go through in order to have a product that is accepted by the market. For example, the founder of Midori explains:

> «We knew about the possibility of the product to be rejected by customers, it is a difficult but necessary phase. The first customers that tested the product found it immature, incomplete and with lots of bugs. It is probably the most difficult part, because you are offering something you created, and you know it cannot have the stability of a product that has been in the market for the past three years. But we did realize that our product could have improved only through the customers critics».

The negative feedback mainly reported were about inutility of the product, bug or inability to understand its use. Only one startup had less negative feedback, mainly concerned about the

design or the aesthetic. Anyway, in all situations, the feedbacks are positively accepted, monitored, filtered, and considered for future changes, even if most of the time it is emotionally challenging.

On the incubators and accelerators side, the results were in general similar. Incubators and accelerators are aware of the possibility of having negative feedbacks and the possible closure or not acceptance from the entrepreneurs' side.

All the four incubators/accelerators have experienced some resistance by entrepreneurs to accept negative feedbacks. In some cases, as arisen from Nana Bianca and Impact Hub interviews, the entrepreneurs, even the more attached to their idea, are really sensible about negative feedbacks, especially if they are consistently related to specific areas. According to M31, most of the time entrepreneurs have a negative reaction because they are sure about their idea and they do not want to change. M31 is aware of the possibility of this reaction and it has learned to deal with it and offer a guide to entrepreneurs. In fact, in all scenarios, eventually the entrepreneurs realize the benefits the feedbacks have, and accept them positively. In only one case, during the interview with the Innovation Project Manager in H-farm, it has been observed a complete rejection leading sometimes to the absolute non-consideration of them.

Then, after having discussed their consideration of negative feedbacks, further questions were aimed at understanding which was their reaction and whether the negative opinions affected their vision about the product.

In general, it is possible to claim that the negative feedback did not negatively affect the vision of entrepreneurs, who were not demotivated from pursuing their business idea. One key aspect that emerged, however, is the importance of understanding the nature and the reason of those feedbacks in order not to be misled towards wrong conclusions. For example, in the case of Midori, after receiving negative feedbacks from customers they found out that most of them were linked to the fact that they installed the product even if they had a photovoltaic panel that interfered with its functioning. In this case, understanding the nature of the negative feedback has been crucial for a constructive use of them.

The same aspect has been assessed during interviews with incubators and accelerators, in order to understand if there were similarities or dissimilarities concerning the two points of view.

The responses were aligned on one consideration. In general, the suggestion they give is to keep the negative feedback monitored, to understand their nature and the reasons they arise from, and to try to keep them into consideration together with their vision to decide new changes. The Community Manager at Nana Bianca explains that it is important for the entrepreneurs to abandon the escalation of commitment. They become attached to the product or to some of its feature that it becomes difficult to change, even if they realize that the product is not giving the expected results. The role of the incubator is in this case to analyze the situation with more rationality, since they are not emotionally attached to the product and to help the entrepreneurs to analyze the feedbacks and to adopt some changes when necessary. It is important to underline that this cannot be considered a general approach because each founder is different and some of them are less willing to accept suggestions. It is the incubator's role to understand how to better help them in this phase.
Similar situation is reported by the mentor at Impact Hub. He admits that the entrepreneurs can be overwhelmed by the amount of external information and they might risk losing track of their objective. The approach he usually uses with entrepreneurs is based on making a list of what should be changed, considering both their vision and external feedbacks, and together prioritizing them based on the fact that they are mandatory or nice to have, considering what is actually possible to do with the available resource.
Moreover, also the Innovation Consultor of M31 underlines the importance of the feedback analysis because they are not all reliable and usable. In fact, he points out:

> «The user has an important influence on the product development choices, but it is not exclusive. It is not possible to think to rely for 100% on customers, but only for 60%, because the vision of the entrepreneurs cannot be ignored. At the same time, however, the entrepreneur must be prepared to change direction if there is a market evidence that the undertaken path is wrong».

To conclude this part, from what observed, it is possible to assume that being prepared to accept negative feedback is a crucial part of the implementation of the approach. At the same time, the risk is being overwhelmed by such feedbacks and lose the vision about the product. In general, entrepreneurs have demonstrated to be aware of such situation, and they try to

approach it with rationality, being ready for changes, whilst at the same time considering their own vision. Actors in incubators and accelerators have recognized that sometimes this phase can be challenging, and entrepreneurs might need help throughout it.

A second element identified as potential limit by theory is the risk of obtaining false negatives or false positive results from testing. After assessing this scenario during interviews, it is possible to confirm that interviewers are aware of the possibility of having false positives and false negatives.

More interesting aspects have arisen from the interviews with incubators. One first response, common to two incubators, is to enlarge the base of users and customers that are testing the product, in this way it is statistically possible to reduce the risk of having misleading results. It is important to avoid the use of questionnaires directly asking customers if they would use the product. Instead, the core idea is to test the product as quicker as possible, to the broader audience available. In addition, it is important to implement a rational analysis of results, without losing the final objective.

In addition, another approach that tries to reduce this risk is used by the incubator M31. When they identify customers interested in buying the products, they usually adopt a letter of intent where is established that, once they will be ready for production, the second party is going to buy a decided amount. This type of tools is also useful to obtain investments, if needed, because they can be presented as proofs to investors.

However, from the startups side, it has been observed that, even if entrepreneurs are aware of this potential risk, they do not implement a particular strategy to try to limit it. In general, it is not considered as a dangerous aspect, and it is considered a theoretical aspect that is difficult to control in the practice.

Finally, the third aspect that is pointed out in the literature is the one linked with experimenting risks. In fact, introducing in the market a product that is incomplete can involve a reputational risk, since it can have a bad influence on the brand and the image of the product.

According to the data gathered through interviews, it is possible to observe that all the interviewers are aware of such possible downsides. However, the risk of bad image and bad brand reputation are never taken into consideration because most of the time the startups

are not yet positioned in the market. In addition, most of them are aware of the possibilities of losing some customers because of the immaturity of the product. However, this aspect is not always considered that penalizing, or, in some cases, entrepreneurs try to limit it, like for example in the case of Awhy that offers 30 days trial period so that the customers can get to know the product without having initial costs.
For what concerns the idea theft risk it is not considered a big risk, because as the founder of Midori confirms:

> «We did not consider the chance that our idea could have been copied because it has a strong technology component behind, so the imitation risk is really low».

The founder of Carepy, as well, admits that, because of these risks, at the beginning they were unsure about implementing this type of approach, even though, eventually, they realized they needed a prototypal approach to develop their idea.
In general, it is possible to recognize that entrepreneurs are aware of all the possible risks linked to the introduction of an incomplete product in the market, but those limits are largely outweighed by the benefits it brings.
This consideration is shared by actors of incubators and accelerators as well. The risk of having a lacking product is considered part of the procedure. The Innovation Consultor at M31 says:

> «If you are not embarrassed of your first product, it means you spent too much time developing it».

Through MVPs entrepreneurs are testing the value proposition, not single features, because they will be identified later, thanks to customer feedbacks. In this phase, it is important to find the core features entrepreneurs want to test about their product. For example, according to the Innovation Consultor at M31, aesthetic aspect is not considered an aspect to dedicate too much attention to. On the other hand, the product cannot lack of quality on the technical features that constitute the product's value proposition. The mentor at Impact Hub expresses the same consideration about the relevance of technical features. Moreover, even among the several technological features, entrepreneurs have to focus on those that are most relevant

to the product. For example, entrepreneurs, who are developing a robot, should focus on its ability to rotate, but then it is reduced to a waste the fact that it can rotate 40° more or less, if that characteristic is not valuable.

In addition, based on the data gathered during the interview with the mentor of Impact Hub, it has been observed that a partial limitation of negative effects can be induced by the way the product is communicated. For example, if the product is communicated as an innovative prototype new to the market, early adopters are more willing to take the risk and eventually they might also help during its development.

In general, the risk of bad reputation of the brand is never taken into consideration by incubators and accelerators because the startups they are working with are not positioned in the market so are less exposed to the risk of bad image. Instead it should be more considered by bigger companies in case they decide to introduce in the market the prototype of a new product.

Another element that has been assessed during the interviews, is whether the entrepreneurs encountered difficulties during the development and the launch of the MVP. Related to this aspect two main elements have been observed.

The problems startups had in this stage were mainly linked to technical aspects of the product and to the management and organization of the developed team. For example, the Clairy team had to face several complex aspects, from scientific tests that could have given value to the product, to the development of the electronic part, and the development of the software, and either of the three founders was an expert of the last two aspects.

This same consideration can be abstracted from the interviews with incubators and accelerators. One of the main difficulties is concerned with the practical realization of the product, since most of the time the entrepreneurs are trying to develop products that are new to the market. This aspect leads to several complexities from technical, project and financial points of view that can extend the time necessary to develop the product.

Moreover, as the Mentor at Impact Hub adds, some teams, especially university spin offs, based on his experience, tend to enter a loop where the product is continuously developed and never considered ready for the market, with the risk of wasting time and resources. There is only one interviewer, M31, that states they have not found difficulties on the technical

aspect of the development, but, he admits, the reason could be that they work with a great team of experts.

The second element that is recurrent relates to the composition of the team. In fact, all the incubators and accelerators, make statements about this. In some cases, it is related to the proactivity of the team and its ability to work fast and effectively. In most of cases, instead, the composition of the team is crucial to the development of the team, because outsourcing the development of some aspects can delay the release time. For example, also the example, previously exposed, of Clairy could be reduced to this second category.

To conclude, some of the weak aspects underlined by the theory, like bad brand reputation, false positives/negatives, do not have an important role in the practice, or are accepted by entrepreneurs and sometimes even mitigated in some way. On the other side, other difficulties like, technical delays and complexity, team composition, that are not taken into consideration in the theory, have a bigger weight in practical aspects.

Element	**Theoretical**	**Observed**
Users' inclusion	- Negative feedbacks: external negative feedback might affect entrepreneurs' vision. - Users feedbacks are not always reliable.	- Negative feedbacks: entrepreneurs are familiar with them and they are mostly accepted as a necessary step. - Importance of understanding feedbacks' nature. - Entrepreneurs might be overwhelmed by amount of information. - Users have an influence on choices, but it is not exclusive.
False negatives/positives	- Risk of obtaining false negative - the product is rejected by the market even if valid - or false	- Entrepreneurs are aware of such risk, and, in some cases, it is not considered a dangerous element.

	positives - the product is accepted even if not valid.	- They try to reduce it by enlarging the users/customers audience. - Avoidance of biased questions in questionnaires. - Use of letters of intent.
Experimenting risks	- Reputational risk: negative image of the brand because of product's incompleteness. - Idea theft: the idea could be copied.	- Risk of bad image is not taken into consideration because startups are not positioned in the market. - Idea theft it is not always considered because of its innovativeness. - Benefits of fast experimenting outweigh risks. - If the product is communicated as an innovative prototype, early adopters will be more willing to take the risk.
Other elements	- n/a	- Technical difficulties of the product and delays. - Organization and management of the development team. - Team composition.

Table 5: Critical issues summary

3.3.3 Pivot

During the interviews, some part of the questions was addressed to understand if the entrepreneurs, after validating their hypotheses, had to adjust their assumption and pivot towards a different solution. Moreover, it has been to mentors asked how they guide the entrepreneurs in this phase and which feedbacks they usually experience.

In general, it has also been investigated how they approached the pivot, and which were the reasons that made them realize it was time to change something in the development of their business.

After having analyzed the data collected, it can be affirmed that all the interviewers have experienced a pivot, and as they report it is usual to observe it. It does not always have the same impact, sometimes is it related to engineering aspects or to a complete revolution of the business, as in the case of a startup accelerated by Nana Bianca where they changed their business from an E-commerce startup to a consultancy one.

The startup interviewed experienced pivot from a business model point of view, in the case of Carepy that changed its revenue model, from a positioning point of view, when Midori changed the way they positioned themselves in the market, from a target point of view, when Awhy switched from targeting small business to big ones. The pivots were mainly guided by the consumer feedbacks or because the sales were not as big as expected.

On the side of incubators and accelerators as well, the lack of resources and market demand are considered the main aspects that lead the startup to pivot. In addition, sometimes pivot is necessary to grow because the first solution will quickly satisfy the identified market and will condemn the startups to remain small. This is what happened with one of the startups incubated in M31, the founder developed a product that could convert any noise produced with hands in music. He found a market, but it was too small, so he had to pivot, and the startup is now producing tactile surfaces for cars, exploiting the same technology.

3.3.4 Business Plan

During the interviews, the interviewers have been asked about the adoption of the Business Plan and its importance, according to their experience. This part of the research is aimed at assessing whether the entrepreneurs or the individuals mentoring and helping them make use of this tool, that according to the theoretical research, has become less important because of

its rigidity. In fact, it has been recognized that startups act in an environment that requires them to be flexible and dynamic. However as pointed out in previous chapters, the Business Plan might still be useful for the startups life, even if it cannot be considered in a structured way but in a more flexible interpretation (DeNoble & Zoller, 2017).

When interrogated about the adoption of a Business Plan, all the startups admitted that they started writing one almost since the beginning.

Three out of four founders affirm that they had to develop the business plans or to apply for incubators or because it was required by investors. They keep it updated but they do not put too much importance on it if it is not for the reasons before stated. It is considered an exercise to understand where your business can lead to, to see if the strategy can work. For example, the founder of Clairy says that they have filled out their first one only one year after they launched their product on Kickstarter, because they needed to work with banks. The founder of Midori as well says that he has a general idea of what should be written in the Business Plan, but they find the Business Model Canvas a more useful tool.

On contrast, only one of the founders showed interest in the adoption of a Business Plan, he says:

> « We used it since the beginning, for an internal reason to think about some parts of the business, and for formal and economic reason to have financial projections. It was useful to deepen some topics that if are not discussed in a formal document, they are instead always faced in a superficial way».

For what concerns the incubators and accelerators side, the opinions are diversified.

On one side stands what gathered through the interview with the Innovation Consultor at M31. In this case, the Business Plan is not taken into consideration since the beginning, because it is difficult to write one for a product that does not exist in the market yet, and it is not possible to quantify anything about it. They prefer to work with the Business Model Canvas, because the Business Plan is useful when the product is already in the market, therefore in a more advanced phase. On a similar position is the idea of the Innovation Project Manager at H-farm, who explains that it is a tool useful for startups to talk with investors, but it is not considered important in the accelerator since they tend to work more on the Business Model Canvas. The fact that usually startups provide for it autonomously has emerged also

during the interview with Nana Bianca. In their case, they are willing to help startups with it and as investors, their first approach with the startups is mediated by an investor deck, where it is possible to find the nature of the project, some key elements, and financial projections. According to the interviewer, they do not usually focus on financial projection because they are not considered reliable but instead they look at information about the team, the nature of the market, and the available competition.

On a different side, the Business Plan is considered a fundamental tool by the Mentor of Impact Hub. However, it is still considered a flexible and adaptive tool. The Mentor explains:

> «The Business Plan changes several times, what done today could be different in three months. However, it is useful to give a direction, to make entrepreneurs understand where they can make money, how much they can spend. The detailed plan is only done once a year, then it is just updated».

More importance is for example dedicated to the financial plan that has to be regularly updated. In general, it has to be updated quite regularly but not too often to become a waste of time.

3.3.5 Startup Environment

After having dedicated a first part of each interviews to assessing some critical aspect about the Lean Startup Approach and its application, the second part of was aimed at examining the startup environment and approach towards a sustainable business model. In particular, questions have been inspired by some key elements of the Effectuation Model (Sarasvathy, 2001). For example, investigated elements included the perception of the external environment, whether it is considered uncertain or risky, the approach to the business, if there is planned or adaptive, the allocation of budget, the analysis of competitors, the use of partnerships, the approach towards future scenarios.

The intention of the research was to analyze if it was possible to observe some of the elements that characterize the Effectuation Model, in order to underline any potential link with the Lean Startup Approach, to understand if there were similarities between the two entrepreneurial approaches.

In the following part each of the element will be reported in an aggregate level as observed during the interviews. In addition, all the data associated with each interviewer is reported in the summary table 6.

- **Risk vs uncertainty**: in this part it was researched the perception that the actors have about the external environment. This element was taken into consideration because of how Sarasvathy describes how having a risky consideration of the external environment is typical of a causal approach, whilst having an uncertain one is typical of effectual approach.

  Data tend toward the uncertain consideration of the external environment. However, individuals tend to agree that entrepreneurs have a general idea of potential risks, but then there is no rational approach and the path keeps changing repetitively. The consideration and the predisposition to risks and uncertainties vary from entrepreneur to entrepreneur.

- **Planning vs adaptation:** part of the questions was addressed at understanding how the entrepreneurs approach the creation of a business. In particular, to assess whether their approach is based on ex-ante planning or it does not include it but, instead, it has an adaptive nature, in response to external changes and contingencies. According to the effectuation model, the entrepreneurial approach is more likely to be adaptive since there is no rational way to know and evaluate all the variables, in contrast with a causal approach that relies on planning.

  Most of the startups have shown an adaptive approach to the business creation. Emblematic is Midori case, the founder explains that they had the idea of a product with the final goal of tracking the energetic consumption. They tried a technology approach and after starting working on it they ended up with the actual product. In the same way the startup Awhy wanted to create something related to the e-commerce and the customer care, but initially the idea of a chatbot was not in their mind. So, the approach can be considered adaptive, especially in the explorative phase. However, data show that entrepreneurs make some researches at the beginning, like for example the founder of Carepy explains that they made few researches to understand the market trend, and that this step was useful to

understand how to create initial questionnaires. In the same way, also the founders of Clairy confirms that they had an evaluation of market trends together with a market study to identify potential initial customers.

The approach is mostly considered adaptive by incubators and accelerators because it results difficult to organize due to the unpredictability of process and objectives. However, the Mentor of Impact Hub specifies:

> «The enthusiasm for the new idea can guide them at the beginning, but after 3/6 months they should start planning, at least to understand where to take the resources needed».

He continues explaining that adaptation is still a necessary attitude because things changes really fast, but entrepreneurs cannot be totally unprepared.

Moreover, there is a tendency, confirmed by more incubators, to plan more by individuals that had prior experiences in the business environment or by individuals that have to leave their job to pursue the entrepreneurial experience. The founder of Clairy, who comes from a financial background, confirms that the project should have followed a strict plan because he would have left had job only if the project would have turned out successful.

- **Budget:** this variable has been identified based on the effectuation principle of allocation of budget based on affordable loss rather than expected returns.

  The allocation of monetary resources is most of the time flexible, and not based on expected returns, because startups have small budgets, and they must try to use them in the most effective possible way. In some cases, there is an attempt to estimate investments in the short run.

  The allocation of budget becomes more structured and planned ex-ante when the number of employees start growing and when startups receive big investments.

- **Competitor analysis and partnership:** it has been decided to explore this dimension because, in the Effectuation Model, competitors should be considered like strategic partners, exploiting cooperative networks.

All the startups confirm they made a competitor analysis in order to understand which other companies were offering similar products, but no one state they thought of them as strategic partners.

On the incubators side, the competitor analysis is highly taken into consideration to understand if there are other actors operating in the market and, in case, to offer a sort of diversification. The Community Manager at Nana Bianca explains:

> «We try to enter the market with some kind of diversification, bringing a competitive advantage in order to avoid offering business model similar to existing ones, that lead to a competition on just a marketing level».

In only one case the competition is taken into consideration as potential strategic partners, by the Innovation Consultor at M31.

Partnership in general are positively considered by incubators and accelerators, even if the nature of the exchange has to be analyzed to understand if it is convenient for the startup. In particular, partnerships are useful when they help startups to reduce the time to market. In fact, for example, Midori exploited its partnership to test the MVP in a faster way.

- **Prevention of future scenarios vs control of contingencies:** the analysis of this attitude what guided by the effectuation principle of: «To the extent that we can control the future, we do not need to predict it» (Sarasvathy, 2001).

  Forecasting in an early stage of the startup is generally considered difficult, because there is no time and no resources to dedicate. There is an attempt to forecast future monetary necessities, or a prevention aimed at avoiding mistakes. In certain cases, particular attention to forecast is dedicated to legal aspects in regulated situations. For example, the founder of Carepy reveals that they always had to keep that aspect under control, because of sanity and privacy laws changes, that could have affected their product.

In addition, there is another element that spontaneously emerged during the interviews and has been, then, furtherly investigated.
It has been noticed that startups start experiencing a moment when their approach towards the organization, in particular related to budget allocation and forecasts.
In particular, three elements influence the entrepreneurs' attitude, in a way that their budget allocation starts being more structured and planned, they start creating marketing, execution and financial plans, and they start allocating more resources to prevention and forecast. A first element, according to the Midori founder's experience, is the launch of the product, he says:

> «In my opinion the startup life can be divided in two phases: pre-launch and post-launch. In the first one there are only costs and nothing to sell, it is not possible to make important forecasts».

The other entrepreneurs interviewed point out that at a certain moment management becomes more structured, mainly it is due to the budget increase or huge investments. In this case, also the number of people working increase because the product is in the market and specific plans for finance, human resources and marketing are needed. The founder of Clairy explains:

> «Our organizational approach changed when we received the two million investment from the European Union. From that moment it was important to carefully manage the budget also because the investment was based on a structured business plan».

Incubators and accelerators agree on such aspects, it is a shared opinion that the startups face a change, especially when they grow enough to have resources that can be allocated to different activities. However, it has to be considered the problem that entrepreneurs are not always prepared for such an important and crucial shift. The Innovation Consultor at M31 explains:

«Often startups are not ready for the post-launch phase, because at this moment new activities are introduced that entrepreneurs did not know about or have underestimated».

An important aspect to consider, according to the founder of Midori, is to reach the launch moment with the smaller number of uncertainties. A fundamental difference between the two stages is that in the first one there are a lot of uncertainties and entrepreneurs have to start making choices, that have to be validated by the market. Once such choices are made, entrepreneurs are aware they are risky but conscious, because they have been validated.

	Risk vs uncertainty	**Planning vs adaptation**	**Budget**	**Competitor analysis**	**Strategic partnership**	**Prevention vs control**
Carepy	Analysis of risks but no clear idea; uncertainty	Adaptive with some researches	Flexible	Clear idea of competition	N.a.	Legal forecasts
Midori	Uncertainty, trial & fail approach	Adaptive	Initially flexible, more structured after the launch	No, because of the innovativeness of the product	Since the beginning, used to test the product	Difficult to forecast in the experimentation phase. In next stages they tried to reduce mistakes.
Awhy	Uncertain and risky. General idea of the path, open to changes	Adaptive, in particular in the exploratory phase.	Flexible at the beginning, more structured after financing.	Clear idea of competitors	Mainly resell and research partnerships	Attempt to forecast technical problems. However, most of the time they face them when they arise.
Clairy	Uncertainty	Generally adaptive but with a precise planned guideline.	Flexible	Yes	No, they did not want any partners at the beginning. Now are considering some partnership proposals.	Strong vision ahead on the future. Decisions taken in the present are based on future plans.

M31	General idea of potential risks. Environment is considered uncertain.	Adaptive	Flexible	Encouraged but sometimes founders do not take the into consideratio n	Competitors should be considered as strategic partners.	Difficult to forecast because of unpredictability
Nana bianca	Risky and uncertain. Some entrepreneurs are more aware of risks.	Adaptive with changes along the journey.	Mainly flexible, structured in some parts.	Analysis useful for differentiati on.	N.a	Attempt to forecast lack of resources and competitors moves. The rest is difficult to foresee.
H-farm	General idea of risks but no rational plan implemented.	Adaptive	Flexible because startups do not have enough resources	Suggested	Depends on the entrepreneur and the project	Depends on the business. Important to consider legal changes.
Impact hub	Uncertainty is always understood but irrelevant; Entrepreneurs have different attitudes towards risk.	General guidelines, but adaptive approach. After 3/6 months a sort of planification is needed.	Flexible, it becomes more structured when they receive founds.	Most of the time is underestima ted by entrepreneu rs; Important to understand differentiati on elements.	Important, but the nature of the contract has to be analyzed to see if it really brings value to the startups.	At the beginning no time and resources; More important when the startup grows.

Table 6: Summary

To conclude, few observations can be deduced from the data gathered. First of all, it is possible to notice that not all the elements of the Effectuation Model are respected in the observed reality. At an aggregate level, it is possible to observe similarities, but it was not always possible to transpose the academic theoretical concept in the real cases.

Another element that has emerged is that startups use an adaptive approach while developing a sustainable business model because the environment requires them to be dynamic and flexible. At the same time, data have shown that some resources are dedicated to planning, mainly related with identification of the potential targets and concerning financial resources, and researches about market trends and competitors.

Moreover, legal and financial aspects tend to be constantly controlled and forecasted, considering time and resources constraints, since are the most crucial ones and the ones that can have a bigger impact on the startups.

Finally, it has been observed that startups face a moment, mostly coinciding with product launch and increase of economic resources, when the organization becomes more structured, and it is important for entrepreneurs to be prepared.

In particular, a difference between the two stages is connected with the level of uncertainties, distinctive of the first exploratory phase, which, thanks to iterative processes of validation, are identified and converted in choices, more or less risky.

Conclusion

This dissertation focuses on the analysis of the Lean Startup Approach and its objective was to analyze the theoretical background and the existing literature about the Lean Startup Approach and exploring limitations and benefits of such tool through an empirical research.

In the first part the theories on entrepreneurial opportunities have been explored, focusing on opportunity recognition, discovery and creation. It has been further analyzed the Causation and Effectuation model by Sarasvathy, and the entrepreneurial bricolage by Baker and Nelson, offering a confrontation of the three approaches.

The second part focuses on the introduction and explanation of the Lean Startup Approach, analyzing the existing literature and comments concerning the approach. In particular, the analysis focused on the main elements of the approach and on limits and potential risks.

As emerge from the study of Effectuation Model and Lean Startup Approach, even if the two approaches have different backgrounds, they share similar elements. The first one has an academic background, while the second one was created as a practical tool for startups to help them finding their business model. However, both the approaches consistently underline the importance of three aspects that characterize entrepreneurial actions: iteration, fast testing and adaptation.

The thirds part of this dissertation offers the results of an empirical research conducted with four startups and four incubators. The goal was to investigate the practical use of the Lean Startup Approach, comparing what observed with what emerged in the literature analysis.

The approach is widely used among startups and incubators/accelerators especially because of the perceived benefits. The approach is helpful for innovative products since it allows startups to test the market and the product reducing the investment risk, helping the entrepreneurs to have a deeper analysis of the product and the business. On the other hand, individuals have pointed out some critical issues related to its application, that need a particular attention. As a method, sometimes it might be difficult to be implemented by entrepreneurs without a guide that can help them to apply the general elements to their specific scenarios. This was not underlined as a real problem by incubators instead. This suggests that the application of the approach might require expertise. At the same time, entrepreneurs have to adopt the right mind attitude and they have to be prepared for the

amount of information they will be exposed to, in order to avoid the risk of eternal iteration. Limitations brought up by theoretical analysis, like users' inclusion bias, false negatives/positives and experimenting risks, have been investigated in the empirical research. Entrepreneurs show to be aware of such risks and limitations. In particular, it is important to be ready to accept negative feedback and analyze them rationally in order to transform them in positive elements and avoid being stuck in an unhealthy iteration loop. For what concerns false negative/positives, most of the time they have a bigger impact in the theory than in the real word, because entrepreneurs confirm they are aware of that risk, but it is not considered a big problem. They still try to reduce them enlarging the customers base during tests and obtaining letters of intent by potential customers. Finally, the risk of bad image and idea theft are not taken into consideration because startups are not positioned in the market and they usually have an innovative product difficult to copy. In general, perceived benefits outweighs perceived limitations.

In addition, startups have shown the tendency to rely on more structured tools like the business plans, together with a more dynamic and iterative approach. The business plan is not used as a reliable forecast but instead as a practical exercise that help entrepreneurs to have an objective idea of their goals. Even if entrepreneurs' journey towards a sustainable business model is always considered adaptive, tools like competitor analysis, financial needs and legal forecast are still useful to reduce uncertainty and the risk of possible mistakes.

To conclude, as arise from this research, the theory the and empirical data describe the entrepreneurial activity as an iterative and adaptive journey, where uncertainty can be reduced by testing the business idea and the product with early adopters.

The Lean Startup Approach, then, if cautiously applied, with attention to its critical issues, could be a useful approach to reduce uncertainty that characterizes entrepreneurial environment, turning it into risky but defined assumptions, trough a process of iterative validation.

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