Combining effectual and causal methodologies in growth-phase startups

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Abstract

Lean Startup is a widely adopted method nowadays, which contains a consistent approach to unveil a valid business model in a scenario of extreme uncertainty. This process involves a significant amount of effectual reasoning.

On the other hand, established companies use planning strategies for their operations where causal reasoning drives the decision-making process based on future market predictions.

There is clearly a gap on how growing startups that have discovered a working business model shift their initial effectual methodologies to more causal methods while they grow. In this thesis, common effectual and causal methodologies are explained and mapped against existing frameworks used in the industry. Furthermore, an analysis of how companies can include causality into the effectual methodologies initially used is done, in particular using the Lean Startup framework.

Furthermore, the intrusion of causal components in effectual frameworks leads to a question of balancing between the causal and effectual components. A simple method to detect whether a startup needs one or the other during its evolution is presented and explained using game theory. Through non-cooperative game strategies, i.e. Nash equilibrium, a simple rule to evaluate the current balance between causation and effectuation can be used.

Key-words
Effectuation, causation, lean, business model, strategy, balance.
I would like to start saying thanks to my supervisor Gregg Vanourek for his valuable comments, insights and lessons in general. The work reflected in this thesis would not have been the same without him.

Furthermore, I would like to express my deepest sense of gratitude to my fiancé, Carolina, who is always encouraging and pushing me to pursue my goals and dreams, and more important, pushing me to be a better person everyday. I would not be here writing this lines if it would not have been for her infinite comprehension and unconditional support before and during the whole process.

I would also like to thank my parents, José María and Carmen, and my brother, Luis, for their continuous remote support and willingness to see me succeed with my personal projects. Also, I want to make a special mention to my grandparents who are a source of inspiration for me.

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# Table of Contents

ABSTRACT .......................................................................................................................... 3  
ACKNOWLEDGEMENTS ..................................................................................................... 4  
TABLE OF CONTENTS ....................................................................................................... 5  
LIST OF ABBREVIATIONS .................................................................................................. 6  
LIST OF FIGURES ............................................................................................................... 7  

1. INTRODUCTION ............................................................................................................ 8  
   1.1 METHODOLOGY ........................................................................................................ 10  
   1.2 AIM AND RESEARCH QUESTION ............................................................................ 10  
   1.3 SCOPE ..................................................................................................................... 11  
   1.4 LIMITATIONS .......................................................................................................... 12  
   1.5 OUTLINE .................................................................................................................. 12  

2. LITERATURE REVIEW .................................................................................................... 13  
   2.1 NON-COOPERATIVE GAME THEORY ........................................................................ 13  
      2.1.1 Best response ...................................................................................................... 13  
      2.1.2 Nash Equilibrium ................................................................................................. 13  
      2.1.3 The Prisoner’s Dilemma ...................................................................................... 13  
      2.1.4 Current applications of Nash Equilibrium ............................................................ 14  
      2.1.5 Limitations in the model ...................................................................................... 14  
   2.2 CAUSATION AND EFFECTUATION .......................................................................... 14  
      2.2.1 Causation and Effectuation differences ............................................................... 15  
      2.2.2 Causation and Effectuation in entrepreneurship .................................................. 16  
   2.3 HYPOTHESIS-DRIVEN APPROACHES ................................................................... 17  
      2.3.1 Lean Startup ....................................................................................................... 18  
      2.3.2 MVP ................................................................................................................... 19  
      2.3.3 Business Model Canvas ...................................................................................... 19  
   2.4 PLANNING STRATEGY .............................................................................................. 20  
      2.4.1 Five Forces ........................................................................................................ 21  
      2.4.2 Balanced Scored Methodology .......................................................................... 22  

3. DISCUSSION .................................................................................................................. 25  
   3.1 RELATION BETWEEN EFFECTUATION/CAUSATION AND EXPLORATION/EXPLOITATION .................................................................................................................. 25  
      3.1.1 Effectuation and Hypothesis-driven approaches ................................................ 25  
      3.1.2 Causation and Planning Strategy ........................................................................ 27  
   3.2 INTRODUCING CAUSATION INTO AN INITIAL EFFECTUAL THINKING ............... 29  
   3.3 REACHING EQUILIBRIUM ....................................................................................... 32  
      3.3.1 Why is equilibrium important? ......................................................................... 32  
      3.3.2 Pursuing Nash equilibrium .................................................................................. 33  
      3.3.3 Entrepreneurship similarities to gaming ............................................................... 34  
      3.3.4 Initial theory evaluation ...................................................................................... 36  

4. CONCLUSION ................................................................................................................. 40  

BIBLIOGRAPHY ................................................................................................................ 42
List of Abbreviations

Business Model, BM
Business Model Canvas, BMC
Lean Startup, LS
Blue Ocean Strategy, BOS
Disruptive Innovation, DI
List of Figures

Figure 1 Image taken from Google trends ................................................................. 9
Figure 2. The effectual process (Saravathy & Dew, 2005b) vs causal (predictive) process (Read et al., 2009)...... 15
Figure 3. Causation vs Effectuation (Saravathy, 2001)........................................................................ 17
Figure 4 Lean Startup “Build-Measure-Learn” feedback loop (Ries, 2011) .................................................. 19
Figure 5. Five forces diagram (Porter, 1980).......................................................................................... 22
Figure 6. Balanced Scored Dimensions, Robert S. Kaplan and David P. Norton (Kaplan & Norton, 1996a) ........ 23
Figure 7. Type of reasoning approach with respect to experience and firm lifecycle (Read & Saravathy, 2005)...... 29
Figure 8. Exploitation Loop and Exploration Loop (integration proposed by this researcher) ......................... 30
1. Introduction

Startups have been traditionally viewed as small versions of established companies (Blank, 2006), and hence, people in startups have used similar tools as those used in established companies (e.g., business plans, similar staffing and structure, strategy frameworks). Management of startups was quite similar to management of established companies, except perhaps that the former were smaller, more nimble and fast moving. Most of the literature prior to the beginning of the 21st century advocates predictive methods, in which market research and business plans were developed before the entrepreneur would energetically pursue launch and growth.

In traditional strategy, predictive rationality is used for selecting between goals in entrepreneurship. In 2001, Sarasvathy developed the theory of effectuation and causation (Sarasvathy, 2001).

Effectuation is the process of imagining a possible new end using a given set of means, while causation is the process of selecting between given means to achieve a pre-determined goal. On the one hand, effectuation has been identified to be a good fit for situations where uncertainty is present and, hence, reasoning processes lie towards exploration methodologies. On the other hand, causation is a good fit when uncertainty is lower and the purpose is to optimize and reach a desired outcome.

The theory developed by Sarasvathy develops a different way entrepreneurship is understood and, of course, how it is taught today. Entrepreneurship is no longer a mostly rational activity in which the entrepreneur has to calculate and predict every single aspect of his/her company applying techniques such as market research, risk analysis, business plans, and the like; instead, entrepreneurship started to explore control theory to drive an organization. Control theory opposes to the predictive theory as it makes decisions based on the inputs obtained from the present situation, instead of deciding based on predictive inputs, and it tries to make decisions to facilitate a beneficial future situation.

There are also other terms appearing in the literature: exploration and exploitation refer to an organizational capability of searching for new capabilities or executing the current capabilities respectively. Exploration includes things captured by terms such as search, variation, experimentation, flexibility, discovery, and innovation. Exploitation includes such things as refinement, production, efficiency or execution (March, 1991).

Many practitioners understand that predicting a new market or company performance in a market in which the company is not currently competing is extremely difficult and comes with very low probability of success. Uncertainty has been established as one of the major problems in startups, and hence the entrepreneurship literature proposes methods to explore and find available opportunities under uncertainty. And hence, the entrepreneur can spot a complete working business model that brings value to the company.

From the literature, there are numerous studies on how to incorporate exploration or innovation into a company’s strategy. Due to the dynamic nature of markets, innovation and exploration in general have been identified as important for companies to be able to adapt to the evolving market. Questions then arise to whether and how existing companies can employ some of the new tools, frameworks, and theories—and their supporting reasoning—that are spreading among startups.
A big portion of the literature focuses on helping established companies find a good balance between exploration and exploitation approaches, given that they have exploitation methodologies in place (March, 1991) (Benner & Tushman, 2003) (Burgelman, 1991). Different types of innovation have been identified and various tools are proposed to minimize the negative impact of exploration and maximize the benefits of exploitation.

However, not much work has been done on how to incorporate strategy into a growing startup, probably due to the more recent nature of these methodologies.

The process of incorporating exploration into established exploitation methodologies can be contrasted with the process of incorporating exploitation into exploration methodologies. In a growing startup, one of the success factors is to find the right way to optimize the business model. Note that the word optimization has been related with causation in the beginning. Therefore, one could extrapolate and generalize the question to: how can an entrepreneur incorporate causation processes (exploitation activities) effectively when effectuation processes (exploration activities) are needed in lower doses?

In order to introduce some recent exploration methodologies like “Business Model Canvas” (BMC) (Osterwalder & Pigneur, 2010) or “Lean Startup” (LS) (Ries, 2011) in comparison to other methodologies coming from the strategy planning theory, such as “Blue Ocean Strategy” (BOS) (Kim & Mauborgne, 2005) or “Disruptive Innovation” (DI) (Christensen, 1997) (Christensen & Raynor, 2013), a graph generated by Google Trends is shown. In Figure 1 Image taken from Google trends, the popularity of the newer exploration methodologies, such as BOS and DI, is compared to the popularity of the BMC and LS. The planning strategy ones try to incorporate the innovation cycles (effectuation) into the strategy of a company (causation) while BMC and LS try to explore multiple hypothesis (effectuation) to figure out where the value is created, delivered and captured in order to maximize it (causation).

Since the appearance of the Business Model Canvas and Lean Startup, it is easy to see a growing trend. This raises the importance of more in-depth studies on how to evolve an organization with effectual methodologies, such as BMC or LS, so they can incorporate causality methodologies.

![Figure 1 Image taken from Google trends](http://www.google.com/trends/explore#q=%2Fm%2F0bbycpd%2C%20Business%20Model%20Canvas%2C%20Disruptive%20innovation%2C%20Blue%20Ocean%20Strategy&cmpt=q&tz=)

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1 Last accessed on the 1st June, 2015 at 20:58:
BMC and LS are customer-centric approaches that propose effectual methodologies and thinking in initial stages. This provides them a significant advantage during the venture’s beginning stages, as uncertainty can be addressed. Once hypothesis are tested and validated, the entrepreneur is encouraged to invest in the ones that create more value, and hence, more causal methodologies and reasoning.

However, the dimensions that are taken into account in these methods are not enough to develop and fulfill causal methodology requirements. For example, notions of risk management or market research are not present in the effectual methodologies.

Therefore, there is a need to explore and research in this area of transition between an initial-stage startup and a more advanced-stage startup with growth capabilities and validated knowledge and how to keep the right balance between exploration and exploitation approaches to avoid sub-optimal extremes: pure causal or pure effectual.

1.1 Methodology

The methodology used in this thesis is inductive. There are several sources of information that have analyzed data in terms of company performance following different theories but dealing with similar problems. There are studies showing the advantages of working in the right balance between exploration and exploitation approaches. Also based on Sarasvathy’s work and subsequent studies together with the new developed theories presented before, there are empirical studies proving the efficiency of effectual reasoning.

Making use of those and basing our investigation on empirical results previously done, the thesis will conclude with a proposed methodology and framework that can be used by startups that are ready to evolve and grow after validating their business model.

1.2 Aim and Research Question

The aim of the thesis is to discover and describe how to incorporate causal reasoning maintaining the right balance between effectuation and causation in the transition between a startup to an established company. The reader should note that there is a distinction between startup, which is searching for a repeatable business model, and a company, which executes a business model (Blank, 2006). Hence, the research question is:

\[
\text{How can a startup, after having validated its business model, incorporate causation methodologies and maintain a good balance between exploration and exploitation to maximize its performance in the growth phase?}
\]

Note that in order to answer this question, the literature of exploration and exploitation is used together with Sarasvathy’s theory of effectuation and causation. Effectuation processes are related with exploration and causation processes are similar to exploitation. Those will be further related along the thesis.

Furthermore, empirical studies have shown that causation is better suited for reaching specific goals, such as reducing the cost of goods sold or increasing market share, while effectuation can be more advantageous in exploratory situations, such as discovering the right delivery channel or discovering the right technology for a particular product (Sarasvathy, 2001).
Effectuation has shown good results in situations where there is high uncertainty, while causation has shown good outcome in a situation in which a defined target needs to be achieved (Read & Sarasvathy, 2005) (Nienhuis, 2010). The two types of reasoning lead to different types of organization and culture, which are major factors that help determine the performance of a company.

Exploitation is needed for a short-term goal while fast adaption methods are needed as well (exploration). Those are also needed for a sustainable long-term situation. Therefore, it is very important that an organization is able to find the right balance to achieve a sustainable growth and maximize performance.

Exploration methodologies correspond to early phases where the uncertainty is reduced and validated knowledge is gathered. This knowledge will constitute the basics for the second phase, exploitation.

It might seem that the two phases exploration and exploitation constitute a sequential process. However, this is far from reality, as companies need to maintain both due to the dynamism of the markets (March, 1991). Companies need to adapt to ongoing changes, which means that exploitation and exploration need to be present and balanced depending on the situation.

In this thesis, current methodologies widely used in entrepreneurship and established firms will be presented and mapped to the concepts of effectuation and causation, and then analyzed to determine how to strike the right balance between them in the case of growth-phase startups.

This thesis attempts to discover and develop some tools that can help entrepreneurs and researchers spot the right balance between exploration and exploitation approaches while a startup grows (the balance changes over time).

1.3 Scope

In this thesis, a substantial work has been put into relating existing theories in the literature, i.e. effectuation/causation with exploitation/exploration. In addition to this, those have been related to existing techniques and methods used across industries.

Different theories that touch upon similar issues are considered and analyzed determining what are the similarities and differences between them. This allows the researcher to consider a broader empirical analysis done by previous research in the field and present different points of view that address similar problems.

The thesis focuses and limits its scope to analyze mainly startups or early stages company situations and how these evolve to become an established company with a sustainable business model.

The theory from the literature research is matched to some of the practical methods currently used by startups, specifically LS and BMC, and some propositions are given to enhance the current practical methods with the results and theory coming from the academic literature, specifically exploration/exploitation and effectual/causal theories.

To finish some discussion is triggered by a problem studied previously in the literature, the balance between exploration and exploitation. A method to detect the right balance between
them is proposed (based in Nash Equilibrium game theory) as, due to the dynamical nature of a startup in this phase, it changes rapidly in this phase.

1.4 Limitations

This thesis is highly theoretical and based on results from other analyses. This is considered an important limitation of the study as it lacks proprietary results and hence, proprietary empirical proof of the discussions presented.

1.5 Outline

The thesis starts with a review on the topic that will be needed by the reader to understand the discussions. The literature review will cover some game theory in Section 2.1 Non-cooperative game theory, the effectuation/causation theory in Section 2.2 Causation and Effectuation, followed by a review of BMC and LS methods in Section 2.3 and it will finalize with a review on strategy planning in Section 2.4 Planning Strategy.

The literature review will be followed by a discussion that relate these theories and propose a way of balancing between them in Section 3. Discussion. Section 4. Conclusion is devoted to explain the findings.
2. Literature Review

2.1 Non-cooperative game theory

2.1.1 Best response

The best response is the strategy or the strategies that brings the most valuable outcome to the player, knowing the other players' (Fudenberg & Tirole, 1991) (Gibbons, 1992). This is the base idea that Nash used to develop his theory assuming that all the players want to win the game, they will play the most favorable strategy.

2.1.2 Nash Equilibrium

John F. Nash developed the Nash Equilibrium theory on his article “Equilibrium points in n-persons game” (Nash, 1949). It is a concept applicable to the non-cooperative game theory where the optimal outcome of a game is one where none of the n players has an incentive to deviate from his or her chosen strategy after considering all the opponents choice.

This theory can be easily explained with a simple game. Imagine two players that have to choose between green or red colors. The green color will give the player +1 point while the red color will give a negative score of -1. The player with more points wins the game. Let’s analyze the possible outcomes of the game:

<table>
<thead>
<tr>
<th></th>
<th>Cooperate</th>
<th>Defect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperate</td>
<td>1,1</td>
<td>0,5</td>
</tr>
<tr>
<td>Defect</td>
<td>-1,-1</td>
<td>2,2</td>
</tr>
</tbody>
</table>

It is clear that both players will choose the green color, and furthermore, in this case we can see that knowing the opponents choice does not affect to our strategy. Therefore, we have reached the Nash Equilibrium.

This theory has provided insight into the factors that govern chance and events inside complex systems in daily life and it serves today as one of the fundamental theories. Examples of these theory applications are widely found in the literature but probably the most famous one is “The Prisoner’s Dilemma” (Poundstone, 1992), where two prisoners have to face the decision of betraying or cooperating with the other in order to get the minimum conviction.

2.1.3 The Prisoner’s Dilemma

A situation is given where two prisoners are isolated, interrogated simultaneously, and offered deals for betraying their fellow criminal. The options of the prisoners are to “cooperate” by not snitching or to “defect” by betraying the other. Furthermore, there is an extra constraint on it that if both players defect, then both will go to jail and serve longer sentence than if both stayed in secret.

Analyzing the possible strategies to follow, we can come up with the table results similar to this:

<table>
<thead>
<tr>
<th></th>
<th>Cooperate</th>
<th>Defect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperate</td>
<td>4,4</td>
<td>0,5</td>
</tr>
<tr>
<td>Defect</td>
<td>5,0</td>
<td>2,2</td>
</tr>
</tbody>
</table>
Lower jail sentences are interpreted as higher payoffs. The maximum reward for each player (in this case, 5) is obtained only when the players' decisions are different. Each player improves his own situation by switching from "cooperating" to "defecting", given knowledge that the other player's best decision is to "defect". The prisoner's dilemma thus has a single Nash equilibrium: both players choosing to defect.

The interesting aspect of this analysis is that both players would have a much better pay-off choosing to “cooperate”. However, as both players want to have the maximum reward, no matter the other player’s solution, they will choose defect.

There is an important learning from this analysis that will be used later on in this paper. The Nash equilibrium does not correspond to the best outcome for each player but is the situation where all the players will not change their strategy knowing the other’s strategy.

### 2.1.4 Current applications of Nash Equilibrium

Nash has been applied to a number of different scenarios. It has been even showed in the cinematographic industry on the movie “A Beautiful Mind” where the life of John Nash is related\(^2\). From the literature review we find that it has been applied in the finance or IT world mainly.

### 2.1.5 Limitations in the model

It has been demonstrated that in games with many strategies available, the equilibrium is harder to achieve due to continuous modifications on the strategy of the players during the game. This leads to a “chaotic” situation where the equilibrium is never found (Galla et al., 2011).

### 2.2 Causation and Effectuation

Causal and Effectual reasoning are well defined in the decision-making theory. It corresponds to two different ways of reasoning and reaching a conclusion.

A decision involving causation is characterized by containing:
- A given well-structured and specific goal
- A set of alternative means
- Constraints on possible means (usually imposed by the environment)
- Criteria for selecting between the means

On the other hand, a decision involving effectuation consists of:
- A given set of means
- A set of effects or a generalized aspiration
- Constraints on possible effects
- Criteria for selecting between the effects

To summarize, causation processes take a particular effect as given and focus on selecting the means in order to achieve it. While the effectuation processes take a set of means and focus on selecting possible effects (Sarasvathy, 2001).

### 2.2.1 Causation and Effectuation differences

Sarasvathy bases her theory on the differences between the decision-making processes coming from the psychological studies. Taking how a person reasons, she detects similarities and apply them to the entrepreneurship world.

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In Figure 2. The effectual process vs causal (predictive) process the main differences in the effectual and causal reasoning are shown. It is important to note in this figure the cyclical nature of the effectual reasoning and the linearity of the causal reasoning.

Effectual reasoning is an iterative process where the “What I know” variable is continuously measured and improved for the next loop.
Causal reasoning is a sequential process where the decision-making takes place in the beginning. Predictions are done and the execution plan is implemented. Once the manager has an execution plan, the manager will update and adapt it over time. There is no notion of cyclical behavior, as adaption will occur taking as a basis the existing business plan.

An important finding of this work was that entrepreneurs and managers of big corporations follow completely different lines of thinking. According, to their analysis entrepreneurs follows an effectual reasoning as they are used to handle uncertainty and think in more creative way to find new solutions to problems. While managers on big corporations followed a very causal approach as they daily work consisted in executing plans to achieve predefined goals such as reduce costs, improve a product, etc.

2.2.3 Causation and Effectuation in entrepreneurship

Sarasvathy identifies that both reasoning processes have cons and pros depending on the context where it is applied.

Traditionally, most of the management and entrepreneurial literature contains its basics on the causal side. The causal reasoning understands that knowing the current situation the future is predictable so we can use these predictions in our decision making process (Einhorn & Hogart, 1981) (Zey, 1998) (Focardi & Jonas, 1998). Finding elements in a market that support the creation of a company has been used until very recent years and even today, examples of this line of thinking are still applied.

Sarasvathy it is the first one that propose to apply effectual reasoning in entrepreneurship. After exploring the characteristics of both reasoning types, she finds that the effectual reasoning is much suited for situations with uncertainty or risk is involved and hence, it is much more suitable approach for entrepreneurship.

An interesting differentiation pointed out in her work is that causation processes are effect dependent while effectuation dependent are actor dependent. This means that causal processes are excellent at exploiting knowledge and effectuation processes at exploiting contingencies (Sarasvathy, 2001). The table below has been extracted from her work and contains a good summary of the two processes:
A lot of theory has been based on Sarasvathy work in the later years, and her ideas have been developed further. A topic of especial interest has been the effect of the entrepreneur in the decision-making process (Dew et al., 2009) (Gabrielsson & Politis, 2009) (Dew et al., 2010).

2.3 Hypothesis-driven approaches

This thesis will base part of its analysis on hypothesis-driven approaches, specifically Business Model Canvas (BMC) and Lean Startup (LS) frameworks. The researcher has chosen these two as representative methodologies that are currently used across different industries but especially in the software industry. BMC and LS have shown good results in newly creates startups and it is widely adopted among them.

Even though those terms are utilized as buzzwords or marketing elements in some cases, during this thesis an analysis of the main concepts behind these methodologies is done as they are considered to reflect some of the theories available in the academic literature.

Alexander Osterwalder analyzed business models in his PhD dissertation (Osterwalder, 2004) and later he created a best-selling book called Business Model Generation explaining how to discover and build a successful business model, including the influential tool they developed called the Business Model Canvas (Osterwalder & Pigneur, 2010).

On the other hand, Eric Ries, the author of Lean Startup (Ries, 2011) and one of the main drivers of the LS movement, draws upon a number of different fields—for example, lean manufacturing, agile software development, design thinking, and customer development—in his development of the LS movement.

Osterwalder and Ries promote methodologies that deal with situations of uncertainty in contrast with previous frameworks that were based on planning strategy. The main difference with this
approach and planning strategy is that decisions are taken with the insights obtained directly from potential customers instead of analyzing a market from the outside and using these predictions as main drivers of the organization’s decisions.

In the traditional thinking, a startup is just a small version of an established company and, hence, the same or similar methodologies can be applied. This implies that market research, risk analysis, and the like would be applied before building something. The entrepreneur needs to be sure that there is an opportunity that the company can exploit before starting (based on predictions).

The new methods state that there is no need to predict anything. Instead, the entrepreneur comes up with ideas and hypotheses that need to be tested against real customers (Eisenmann et al., 2011). This validation process serves them to build validated knowledge, which is where the value of a company resides.

2.3.1 Lean Startup

The Lean Startup (LS) method does not originate from academic research. However, it is a method that is being adopted by many startups around the world, as well as other kinds of organizations seeking to innovate. While this method contains a lot of marketing and “catchy” words, this thesis’ researcher judges that it contains some concepts that are relevant to this thesis. Methodologies to handle uncertainty, gathering knowledge through repeated iterations, and control methods to find the most valuable business model are some of the elements that will be critically analyzed throughout this thesis.

LS is based on five pillars (Ries, 2011):

1. Entrepreneurs are everywhere. His definition is of a startup is “a human institution designed to create new products and services under conditions of extreme uncertainty.” This means that an entrepreneur can be in a startup or a very large company.
2. Entrepreneurship is management. A startup is an institution, not just a product, and so it requires a new kind of management specially geared to its context of extreme uncertainty.
3. Validated learning: a company needs to gather knowledge by running experiments to test each element of our vision so the entrepreneur can learn scientifically how to build a sustainable business.
4. Build-Measure-Learn feedback loop: represents the execution plan to turn ideas into products, measure how customers respond to them and then judge whether to pivot or persevere based on the validated learning obtained.
5. Innovation accounting, in which the progress is measured, milestones are setup, work is prioritized based on the metrics collected.

One of the main contributions of this method is the feedback and learning loop in order to obtain validated learning. Ries refers to this as all the knowledge obtained from the feedback loops when trying multiple hypotheses. It allows the entrepreneur to understand and find where the real value of a business model is hiding and also allow him/her to “pivot” in case no value is found in the existing hypothesis.

“Pivot” is an important concept in the LS, it refers to a decision of changing the current business model to test a new fundamental hypothesis and give the organization a new direction. “Pivot” or
“Persevere” is a decision that can occur during the interactions through the build-measure-learn loop.

The Build-Measure-Learn feedback loop is designed to transform an idea into validated learning, which can work well when working in extreme uncertainty.

One of the main consequences of the method is the instruction of the concept “fail fast and learn fast”. Wrong hypotheses should be detected early so they can be discarded in order to find valid ones.

Recently, Steve Blank critiques this loop as not being completely accurate. According to the loop, the entrepreneur needs to come up with ideas that need to be tested and finally learned from with the results measured afterwards. He points out the importance of understanding that “ideas” is probably not a clear word and instead he proposes to use “hypothesis” that needs to be demonstrated.

2.3.2 MVP

Minimum Viable Product is defined by Ries as follows:

“The minimum viable product is that version of a new product which allows a team to collect the maximum amount of validated learning about customers with the least effort” (Ries, 2011)

The MVP is the tool required to achieve validated learning. Ries combines this concept together with the customer development theory (Blank, 2006). It is important to note that Ries places emphasis on the fact that the MVP is mainly used to gather knowledge and it does not necessarily match with a minimal version of the final product. In Section 3.1.1 Effectuation and , it will be explained why this characteristic is extremely important in the decision-making process.

2.3.3 Business Model Canvas

A simplistic approach to define business model would be to say that is the plan describing how a company makes money. Osterwalder addressed the importance of the business model in his PhD dissertation (Osterwalder, 2004). One of his contributions was to represent a business model in a

compacted manner using his BMC tool. Even though business models had been studied and viewed as important earlier, Osterwalder gave an important new (revised) definition and created the before mentioned BMC tool which was a real contribution as well. He was able to define common dimensions that are present in any business model regardless of the industry. The definition of business model can be built as:

\[ \text{The rationale for how an organization creates, delivers, and captures value} \]
(Osterwalder, 2004).

The BMC describe multiple dimensions of the business model where the organization needs to succeed to find the most valuable components and its integration. It does not only contain financial aspects of a company but it stresses the importance of customers, value proposition, channels, etc.

The BMC was influenced by the design thinking, which was developed in the late 1990s by the design consultancy IDEO (Kelley & Littman, 2001). This approach emerged some years before raising the importance of the customer needs and hence, developing a theory and a framework that was “customer centric”. Some of these concepts were adopted by the BMC and by the LS later.

2.3.3.1 BUSINESS MODEL CANVAS AND LEAN CANVAS

The Lean Canvas (Maurya, 2012) and BMC are simple representations of a business model (on one page). It contains 9 dimensions where the entrepreneur can figure out the company’s plan from end to end. Note that even in the thesis are treated equally from a high level point of view, the Lean Canvas and Business Model canvas contain some differences that will not be treated in this thesis.

2.4 Planning Strategy

Strategy applied to the business world constitutes the plan that a company designs to achieve/maintain/gain market share and make revenue. There are different business strategies available in the literature focusing on different dimensions and goals in the organization. In the literature there are multiple strategies ranging from the ones that seek to promote innovation to the ones used to optimize a company’s performance. An example of the first one can be Blue Ocean Strategy (BOS) and Disruptive Innovation (DI) that were mentioned in the introduction.

Due to the large amount of the existing literature in this area, this section will limit the study to representative planning strategies methods used today in the industry. The scope of this section is to extract the key elements from different frameworks that tries to maximize performance once, the uncertainty has been reduced, e.g. balanced score card or strategy map.

The planning strategy is probably the more traditional view on strategic management. There have been widely read pieces such as (Porter, 1980) or (Ansoff, 1979) that emphasize the need for systematic and integrative analysis.

These approaches characterize for putting a lot of attention into the company situation, scanning trends and evaluation of alternatives to come up with the best possible strategy (Shendel & Hoffer, 1979) and even betting for ‘no regrets’ (Courtney et al., 1997). Hence, planning strategy refers to a specific type of strategy where plans based on predictions are used as main inputs in the decision-making processes.
Uncertainty has been also studied under the predictive umbrella and the rational planning view advocates that in situations with higher uncertainty, organizations should put more effort and diligence in carrying out prediction more accurately (Goll & Rasheed, 1997) (Brews & Hunt, 1999). They expose success cases where planning strategy and predictive work can guide companies to position for the future even in uncertain situations.

There has been two main arguments that have lead this research tendency in the past for uncertain situations. The first is that entrepreneurs or managers are always biased in the process of decision-making and through rational and predictive planning this bias could be lowered or even removed (Ansoff, 1979) (Priet et al., 1995). The second is that even if prediction is not completely accurate, the systematic approach and discipline proposed by these frameworks is valuable (Szulanski & Amin, 2001).

In the following sections, an overview of two representative planning frameworks will be presented. These frameworks have been chosen based on the company adoption, and these represent some of the methodologies widely used by today following the planning or predictive strategy principles.

The first theory is the “Five forces” from Porter who develops a methodology to understand and analyze how the value is shared in the studied industry. This theory allows the prediction of the profitability or performance of a company in some industry taking into account that are the agents that are present in it. The second method exposed in this thesis is the “Balanced Scorecard” which is used to track and measure the performance of a company in relevant areas, analyzing different dimensions of the organization. This theory was one of the first to raise the importance of non-financial measurements to determine the performance of an organization.

2.4.1 Five Forces

Michael Porter developed the “five forces” framework in 1980, and it is widely used and popular even today.

The five forces is a way to describe and analyze how an industry shares the value among the different actors present in it. Competitors, suppliers, Buyers and entry barriers are analyzed to determine how the value of an industry is distributed. Porter argues that the balance between supply and demand can determine the attractiveness of an industry (Porter, 1980).

The framework presents this analysis through five dimensions, or “forces” as he refers to them:

- Threat of new entrants: new entrants bring new capabilities and desires of gain market share that can put pressure on prices, costs and rate of investment.
- Bargain power of customers: powerful customers can capture more value by forcing down the prices, demanding better quality (making the costs to raise up). Customers are more powerful when they have a better position relative to their competitors.
- Bargain power of suppliers: powerful suppliers capture more value for themselves by charging higher prices, limiting quality or even shifting costs to industry participants.
- Thread of substitutes: following Porter’s definition “a substitute perform the same or similar function as an industry’s product by different means. When the risk of substitute is high, it limits the industry’s profitability.

- Rivalry among existing firms: this is probably the most evident of all the forces. Exiting competitors can impact the profitability of a company in multiple ways, e.g. price discount, new product offerings, etc.

This analysis is capable to predict how the economic value of an industry is shared and hence, Porter argues that it can be used to detect early opportunities or foresee the evolution of the industry.

2.4.2 Balanced Scored Methodology

The Balanced Scorecard was created to track and measure the performance of a company. Kaplan and Norton identify the need for multiple dimensions (financial and non-financial) when evaluating a company and making sure that the strategy or vision selected is implemented (Kaplan & Norton, 1996b).

The solely financial measures are inadequate for guiding and evaluating the journey that companies must make to create future value through investment in customers, suppliers, employees, processes, technology, and innovation (Kaplan & Norton, 1996a).

Kaplan and Norton identified four perspectives that permit a balance between short-term and long-term objectives. Companies, once they have identified what are the strategy and plans, can define metrics to track their achievements and determine where the weak points are in order to
improve those. Balanced Score card proposes a framework to select relevant metrics in the four dimensions for tracking the status of a strategy (Kaplan & Norton, 1996a).

Figure 6: Balanced Score Dimensions, Robert S. Kaplan and David P. Norton (Kaplan & Norton, 1996a)

Four dimensions are identified and presented in the figure below:

- **Financial**: businesses can have different plans according to their development stage. For simplification, three are presented: rapid growth (early stages), sustain (expansion) and harvest (established company) (Kaplan & Norton, 1996b)

- **Customer**: customers and market segments are identified and tailored measurements for evaluating the performance are decided. Typical examples of metrics in this dimension can include customer satisfaction, customer retention or customer profitability.

- **Internal Business Processes**: this section is to analyze the internal processes that have impact on customer satisfaction and achieving the financial objectives. This perspective not only refers to existing processes in the organization but it can also reveal new ones that help to meet customer and financial objectives.

- **Learning and Growth**: this perspective identifies what is the infrastructure that the company needs to build to create the long-term growth and improvements. This is due to the understanding that internal processes and customer sections are not able to meet the long-term plans and hence, this perspective try to identify what is needed to evolve the company to meet not only the short-term plans but also the long-term ones.
It is important for the reader to stress that these theory is based on the assumption that a strategy is a set of causes and effects and hence, it can be expressed as a sequence of if-else statements (Kaplan & Norton, 1996b). A nicely built Balance Scorecard should uncover the statements and measurements should determine the correct path so managing a company is a matter of predicting and planning correctly all our possibilities in the industry.

To conclude the section, Kaplan and Norton extended the initial description of the Balanced Scorecard methodology with different extensions. One that is relevant in this context is the Strategy Map (Kaplan & Norton, 2004) where the relation between components in the different dimensions are linked. These links serve the manager/entrepreneur to determine what are the consequences of under-perform in any of the dimensions and then, allow him/her to resolve the under-performing factor before it could happen.
3. Discussion

In order to answer the research question, it will be divided in three sub-questions that will jointly answer it using the theory and concepts explained in previous sections.

1) What is the relationship between Sarasvathy’s theory (effectuation vs causation) and the exploration and exploitation approaches?
2) How do the newly developed entrepreneurship theories include causation, once uncertainty is reduced?
3) How can a startup ensure that it reaches the right balance between exploitation and exploration that matches its specific circumstances?

The three sub-questions are discussed separately in the following sections and related so a complete answer to the initial question can be given.

3.1 Relation between effectuation/causation and exploration/exploitation

The literature study showed and explained what are the main ideas in recent startup methods, such as Business Model Canvas and Lean Startup, and the main ideas in strategy planning frameworks, such as Porter’s Five Forces theory or Balanced Scorecard.

In this section, an in-depth analysis of the different dimensions involving causation and effectuation are mapped to these theories in order to determine the degree of effectual or causal reasoning behind them.

3.1.1 Effectuation and Hypothesis-driven approaches

As the main interest of this section is to extract the effectuation components present in the BMC and LS frameworks, the researcher will refer to them as hypothesis-driven approaches when pointing to common concepts or components.

Looking at Figure 3, an analysis between effectuation and hypothesis-driven approaches will be done analyzing each of the dimensions:

- **Givens:** in effectual reasoning the entrepreneur adapts to the available means or tools. This is exactly what the BMC method wants to discover, using also the related concepts of Customer Development (Blank, 2006) and LS. The main purpose of the method is to validate a business model from end to end. This is done through feedback loops and interactions between customers and the company (Figure 4 Lean Startup “Build-Measure-Learn” feedback loop) where initial hypotheses are tested and validated to measure the added value.

  Effectual reasoning evaluates the initial available means and tools and come up with the most valuable effect. The means in entrepreneurs are defined by Sarasvathy as “who they are, what they know, whom they know” and based on this, entrepreneurs decide what to chase.

  It is easy to see the relationship when mapping this reasoning to the Business Model Canvas. The entrepreneurs make initial hypothesis and assumptions on their BMC
based on who they are, what they know and whom they know. The BMC represents different dimensions that help the entrepreneur concretize the initial means. Once the means are decided, entrepreneurs will need to validate and pursue the activities that give them the best outcome.

The validation is one of the key aspects and the one that allow them to know more, and hence, transform the means to new ones which can be translated into new goals in the longer term.

One important aspect explained in these theories is what is called “pivot” (Ries, 2011), in which the entrepreneur decides if given the current set of means is worth changing the direction and pursuing a new goal. As the means change on its cycle, the effectual reasoning and hypothesis-driven approaches allow the entrepreneur to choose the goal (or intended effect) that gives him/her the maximum added value.

- Decision-making selection criteria: effectual reasoning proposes to select between possible effects that can be created with given means and that is exactly what hypothesis-drive approaches chase. These methods are built around the idea of trial and error in order to detect what is the most valuable business model through multiple iterations as seen in the LS execution loop (see Section 2.3.1 Lean Startup) and in the concept of MVP (see Section 2.3.2 MVP).

According to Sarasvathy, the selection criterion in effectual reasoning is based on “affordable loss or acceptance risk” which means that the criteria takes into account the amount of effort compared to the return expected, in contrast to just deciding based on the expected return (causal reasoning). There are two parts that are relevant in the definition of MVP, “maximum amount of validated learning”, which means in effectual reasoning terms to chase the outcome that brings more value, and the second part of which points to “with the least effort” which can be translated in effectual reasoning terms to be an affordable risk.

- Competences employed: Sarasvathy stipulates that effectual reasoning is excellent at exploiting contingencies. This is one of the key aspects and main differentiators between effectual and causal reasoning. Effectual reasoning is not based on any prediction or expectation, and hence, it is best fitted to treat unpredictable events. Those will be taken as means to decide the final goal. Hypothesis-driven approaches is based on the premise that startups move on situations of uncertainty and hence, as Sarasvathy points out, effectual reasoning and methodologies seem to be better fitted in the context.

- Context of relevance: effectual processes seem to be ubiquitous in human action. Effectuation moves in the uncertainty and hence, it allows decision-making in an unknown environment where not predicted components happens. This is achieved by the cyclical nature of the hypothesis-driven approaches where non-expected events are treated as new conditions for the next iteration.

- Nature of unknowns: effectual reasoning focuses on the controllable aspects of an unpredictable future. One of the core differences between the older entrepreneurship innovation theories and the hypothesis-driven approaches is the lack of market research or risk analysis included in the initial plans. While a business plan should contain a detailed analysis on the possible competitors and a detailed list of risks that
can affect the startup, a BMC does not contain it directly as an explicit block in the canvas. However, Osterwalder says that entrepreneurs should take into account competitors as a complement to the BM. However, the effort spent on it is much smaller than in a more traditional business plan and it is not directly affecting the BM description but it is rather used as a complement.

- Underlying logic: effectual reasoning assumes that to the extent “we can control the future, we do not need to predict it” (Sarasvathy, 2001, page 252). The second part is really emphasized in the hypothesis-driven approaches. It is one of the main differentiators with theories that advocate for developing business plans and more market research or risk analysis. Hypothesis-driven approaches focus on validating knowledge with the given hypothesis and not predicting performance of those assumptions.

The methodology is designed to avoid the need for predictions. It is a feedback loop with a continuous evaluation of the current means to determine if the set goal is still valid or there is a need to change it.

- Outcomes: effectual reasoning advocates for “new markets created through alliances and other cooperative strategies”

It is worth also mentioning the similarities between the effectual reasoning process and the way to handle uncertainty in proposed by the cyclical loops in the BMC method. Comparing the loop to gain validated knowledge with the one explained in Figure 2, similarities, not only on the cyclical nature, can be seen. This thinking process has been analyzed in the industry and it is present among expert entrepreneurs. This thinking is the foundation of the newer methods such as BMC and LC that are widely used by today.

### 3.1.2 Causation and Planning Strategy

In the same fashion than in the previous section, an analysis of the causality residing in the planning strategy frameworks presented before is done.

Looking at Figure 3, each of the dimensions mentioned are analyzed against the planning strategy theories:

- **Givens:** in causation the effect is given. Causation starts with an end goal that needs to be achieved and it tries to gather the means to realize it. A change in the goal is not an option in this type of reasoning. This is very similar to the planning strategy frameworks and theories where a goal is decided and then the tools and frameworks can help the organization to achieve it.

Taking Balanced Scorecard (BS) as the example here, this method consists of a central vision that needs to be achieved. In order to do that four dimensions are defined, together with their respective metrics, to measure the evolution and detect risks in advance so they could be avoided.

- **Decision-making:** in causation the decision-making is dependent on the goal and the decision driver who selects the means that he/she knows to reach the desired effect (Sarasvathy, 2001).
Causation also explains the selection criterion is based on the expected return. This is the one of the pillars in planning strategy as predictions and analysis are done in order to select the possibility that is more profitable.

Porter and BS are precisely defined to find out the means to reach a goal or to measure possibilities to decide which is goal to pursue. Both focus on the current situation and how the situation should evolve to reach the desired goal or effect. If the reader has a close look to the Porter and BS theory explained in Section 2.4 Planning Strategy, the first theory tries to measure how the value is shared in an industry in order to know if it is possible to gain some profit in the scenario while the second tries to identify relevant metrics to measure its performance. Both are used to make predictions and detect risks so can be solved before they occur.

- Competences employed: causation is really well suited for exploiting knowledge. This is due to the process of selecting the means to reach the effect. The means selection will directly depend on the knowledge of the decision-maker.

In the same way, planning strategy evaluate which the current means are. These can be directly related with the knowledge that the decision-maker has as he/she will have to decide based on the metrics and analysis done through the planning strategy frameworks.

It is also important to mention here that the decision-making process done by someone is always biased. This is a component that many of the available frameworks such as BS or SWOT try to minimize by exposing more metrics in different dimensions and making evident more factors.

- Context of relevance: Sarasvathy identifies the causal process static and linear. Environment changes are not taking into account in the planning strategy. The planning strategy contains a detail risk analysis and predictions on what to do when a situation occurs. If the reader remembers from Section 2.4.2 Balanced Scored Methodology, the plans are a sequence of if-else statements and hence, nothing is considered outside those statements.

The linear and static nature of causality does not allow the decision-maker to incorporate information from a changing environment. This is mapped to the planning strategy where everything is measured and decided in advance, not allowing late incorporations to change the execution plan.

- Nature of unknowns: according to Sarasvathy, causal reasoning focuses on the predictable aspects of an uncertain future. Planning strategy is built on this idea, and a good example of it is Porter’s theory. Porter’s evaluate the market value distribution among all the players that are present in it.

This can be very usefull in more static markets where the distribution does not change very often. Predictions work according to what was measured and hence, it contains more factors to reach a better decision. However, in dynamic markets or new markets the environment changes much more rapidly and hence, the analysis can lead to wrong assumptions or old assumptions that are no longer true.
- Underlying logic: causation defines the underlying logic as “to the extend we can predict the future, we can control it”. This is what strategy planning aims for, it is a sequential process where the decision maker predicts possible outcomes from the current situation and then, tries to control them.

- Outcomes: competitive advantage is what an organization needs to succeed in a market. Planning strategy do not advocate for commonalties between different organizations but rather focuses on differentiators that can bring it more value compared to its competitors.

3.2 Introducing causation into an initial effectual thinking

Sarasvathy continued her initial theory of causation versus effectuation and developed the theory further, focusing on how small and large companies differ in the way of reasoning and making decisions. She also investigates if previous experiences determine the decision-making processes, concluding that expert entrepreneurs tend to use effectual reasoning while expert managers in big corporations develop causal reasoning skills.

Startups with effectual methodologies gather a lot of information about the environment where they operate and the industry where they are present. Entrepreneurs are used to manage uncertainty and become masters in the art of handling it as they see the potential of these methodologies (Read & Sarasvathy, 2005).

However, once the startup starts to grow and expand, exploitation methodologies are needed to maximize the return and profitability. Processes become more efficient and internal organization structure is created in order to exploit the discovered market fit and maximize its revenue. Therefore, there is a transition between effectual reasoning (in which an entrepreneur tries to find a suitable business model) and causal reasoning (in which the company sets more efficient processes to reduce costs, increase customer loyalty, etc.).

![Figure 7. Type of reasoning approach with respect to experience and firm lifecycle (Read & Sarasvathy, 2005)](image-url)
Figure 7 represents the transition from a startup with pure effectual reasoning to a large company with pure causal reasoning (Read & Sarasvathy, 2005). It clearly represents a shift in the reasoning that evolves with the experience. Note that experience in this context can be thought as the amount of knowledge that a company gathers over time.

In the previous section, the methodologies and theories introduced in the literature review are related with causation and effectuation. This means that following Sarasvathy’s findings, startups with effectual methodologies gradually shift to causal reasoning with experience or knowledge.

In this section, a suggested evolution to the LS method is proposed. The evolution to the current framework intends to incorporate this shift from the pure effectual loop explained in section 2.3.1 Lean Startup to the more causal methodologies, such as Five Forces or Balanced Scorecard. Hence, this thesis proposes a more complete framework where a company not only discovers a viable business model in the initial stages but also, it represents and takes into account the exploitation loops (causal reasoning) with experience. From a company point of view, pure effectual reasoning loops are not sufficient to operate efficiently in the short term and, hence, the notion of causality needs to be included.

Hence, an additional component to the loop is proposed. The figure below represents how the loop can be extended to include causality:

![Figure 8. Exploitation Loop and Exploration Loop (integration proposed by this researcher)]
Figure 8. Exploitation Loop and Exploration Loop is one of the main contributions of this thesis researcher to complement and enhance the LS original method. The right side of Figure 8. Exploitation Loop and Exploration Loop represents the LS loop that was presented in Section 2.3.1 Lean Startup. The left side represents causal reasoning, in which the initial step is a validated business model.

A startup using hypothesis-driven approaches such as BMC and LS will start with some initial hypothesis or ideas and test them with potential customers. It will iterate over time to learn and gather knowledge, which allows the entrepreneur to find and keep valuable ideas. If the entrepreneur is able to find valuable ideas and build a business model out of them, gathering enough knowledge, the organization may be able to evolve to exploit this knowledge and business model in order to grow and increase revenue.

The exploitation loop on the left side incorporates notions coming from planning strategy. In this loop, the main goal is to expand and improve the business model, including new variables that were not available before. Market research and risk analysis will be performed to spot potential opportunities to maximize growth, and then a strategy will be selected accordingly to achieve specific goals that can maximize the growth and revenue of an initial business model. In this context, the market refers not only how the company interacts and fits in the market (included in the business model already) but how the market evolves with the company presence and how the competitors react on it. This is expressed through the position box in the loop.

In the exploitation loop, uncertainty is reduced and predictions about company performance and market evolution (including competitors) contain reliable information that should be taken into account in the next loops. Therefore, planning strategies can make more accurate predictions about the evolution of the market.

The results of the causal loop are also included in the company’s knowledge and learning. Those results are not only valuable in the exploitation loop but they can also trigger new ideas and hypotheses that can influence the exploration loop.

However, the introduction of a new loop brings a new dimension that must be taken into consideration. A company should develop exploitation methodologies as they include optimization that can positively impact the revenue of a company directly, but at the same time, an organization should maintain a certain degree of the exploratory methodologies so the organization does not lose its capabilities to innovate or adapt to future changes.

The “learn” component becomes the most important part in our loops and it is the common piece between the two loops. Initially, it will contain validated knowledge obtained through iterations when validating a business model in the exploration loop. In later stages, knowledge is still gathered coming from the exploitation part, which gives more information about the market and components.

Note also that after finding the business model and being able to do execute the exploitation loop, exploitation and exploration loops can run in parallel or sequentially in the organization. It was exposed previously techniques that propose a parallel execution in different parts at the organization, such as ambidextrous organizations, in contrast to punctuated equilibrium that advocates for a sequential execution at the company level. It will be the task of the entrepreneur to figure out which is more suitable for the company’s operations. In this thesis, this particular aspect related to execution will not be discussed and is left as a possible future research topic.
3.3 Reaching equilibrium

Exploitation (causal methods) and exploration (effectual methods) are now working together according to the loops presented in the previous section. The next question to solve is how the entrepreneur can balance these two over time in order to maximize the company’s capabilities. This question needs to be resolved to give validity and completeness to the presented framework.

3.3.1 Why is equilibrium important?

Exploitation and exploration are terms that since they were first mentioned by March’s articles in 1991, have been accepted and used on organizational analyses of technological innovation, organization design, organizational adaptation, organizational learning and competitive advantage (Gupta et al., 2006).

There have been multiple attempts to agree on a universal definition and boundaries for exploration and exploitation. However, for the purpose of this thesis the differences between those are not relevant as they differ on the definition of learning and whether exploitation contains learning or not. According to Benner and Tushman, "Exploitative innovations involve improvements in existing components and build on the existing technological trajectory, whereas exploratory innovation involves a shift to a different technological trajectory" (Benner & Tushman, 2003)

Exploitation allows the firms to maximize the current profits. It involves the improvements and facilitates to maximize the return on an established product. To give the reader a better idea of what exploitation is in an organization, an example is presented. Assume a company has already validated a business model and counts with a number of customers. The process of exploitation will mean that the company minimizes the costs of production, try to expand for a larger number of customers or perform incremental innovation on their products. All these are done in order to maximize the benefits of an initial solution or product.

Exploration refers to the shift in the technology or product trajectory. It involves the search of new areas where a company can operate. Exploratory allow companies to adapt to the dynamicity of the market, such as emergent technologies or new competitors. Exploratory methodologies are more flexible than exploitation methods, however exploitation methods will be present in the phases that bring more value to the company.

There has been several studies that points to the importance of a good equilibrium between exploitation and exploration methodologies as it is one of the keys to have a sustainable business model in the short and long term (March, 1991) (Benner & Tushman, 2003) (Burgelman, 1991) (Holmqvist, 2004).

Some studies have concluded that the answer to achieve exploration and exploitation lies in “ambidexterity” (Benner & Tushman, 2003), whereas others have concluded that the answer lies in “punctuated equilibrium” (Burgelman, 2002). Both conclude that equilibrium is important, however complete different methodologies are presented in order to achieve it.

Ambidexterity refers to the synchronous pursuit of both exploration and exploitation via loosely coupled and differentiated subunits or individuals, each of which specializes in either exploration or exploitation. This assumes that exploration and exploitation are orthogonal elements and hence, must be carried out separately. In contrast, punctuated equilibrium refers to temporal
rather than organizational differentiation and suggests that cycling through periods of exploration and exploitation is a more viable approach than a simultaneous pursuit of the two. Punctuated equilibrium advocates that exploration and exploitation are not orthogonal and exploration can benefit from exploitation and vice-versa (Gupta et al., 2006).

In this thesis, these sources and empirical resources are used to demonstrate the assumption that equilibrium needs to be achieved. The literature exposed before demonstrate methodologies and propose mechanisms to achieve the equilibrium in different environments.

3.3.2 Pursuing Nash equilibrium

In the previous section, empirical proof of the need to reach the equilibrium between exploration and exploitation is given. Also, techniques on how to apply exploration and exploitation methodologies are also explained. However, there is still a fundamental question, how can a company know if the balance between exploration and exploitation is the correct one? Should a company put more effort exploration or exploitation?

Understanding that exploration and exploitation is needed to cover short and long-term plans, we will try to understand how much of those are needed in a particular organization. In order to do this, Nash theory will be used in this context to develop a framework that allow the company to know at any given point in time if the current balance between exploration and exploitation is the right one. Nash equilibrium is applied directly to find the balance between exploration (effectual reasoning) and exploitation (causal reasoning).

The reader can assume that Business Model or Lean Startup methodology contains a much higher component of exploration or/and effectual reasoning (see Section 3.1.1 Effectuation and ). Whereas, Planning strategy contains a much higher volume of causal reasoning (see Section 3.1.2 Causation and Planning Strategy). It has been demonstrated as well that depending on the situation planning strategy or BM/LS can be very effective. BM/LS are extremely powerful when handling situations with high uncertainty while planning strategy methodologies, such as Balanced Scorecard, have shown great results when trying to achieve a specific goal.

*The Nash equilibrium theory can be used to determine the right balance between effectual and causal reasoning present in an organization.*

A range starting from pure effectual methodologies to pure causal methodologies at the company level is considered as our pure strategies initially. The extremes in these range would be having a pure effectual or a pure causal methodology and in between there is a wide range of possibilities combining more effectual or more causal thinking. The strategy with right proportion of causality and effectuality in an organization’s should be selected to maximize the organization’s revenue. The right proportion will be determined by having the right equilibrium between causation and effectuation.

The companies operating in the market will choose between these pure strategies to maximize their revenue. An organization that aims to maximize its situation and growth (best response) can choose between pure strategies, forming a mixed strategy (baseline to apply Nash theory). This means that an organization has the capability to choose the strategy that contains the right proportion between all of them. Therefore, an organization needs to determine what is the right combination of these pure strategies to form its mixed strategy.

Now if we apply the Nash equilibrium in this context, it means that the optimal mixed strategy will be the one that even if knowing what is the strategy of an organization’s competitors, the
organization’s strategy do not change. Therefore, the right balance between exploration and exploitation will be one that is maintained even when knowing what is the balance and strategies of the organization’s competitors.

This simple but powerful rule lead allow us to determine what is the strategy that an organization can follow pursuing to get the maximum benefit assuming that all the competitors are pursuing to maximize their own benefit as well (best response).

There is an important direct consequence of this statement:

\[
\text{It is the competitor’s balance and market what determine the “right” balance between the company’s causality and effectuality. Understanding “right” balance as the balance that will maximize the benefit of the company.}
\]

### 3.3.3 Entrepreneurship similarities to gaming

This section is devoted to see similarities between entrepreneurship and a simple luck game. It will serve the reader to understand the consequences of using Nash in the entrepreneurship context.

On the one hand, a game will be used to apply Nash and the similarities between the game and entrepreneurship phases will be made evident so the reader can understand better how this theory can be introduced in entrepreneurship.

The game is simple: Imagine a finite bucket of balls where green and red balls are mixed. The players can take as many random balls as they want on each turn. Players will gain +1 point whenever a green ball is taken and will get -1 point whenever a red ball is taken. How many balls would you take? Why?

#### Purely causal approach

1) The player estimates the number of balls according to the bucket size
2) Based on other players’ results before him/her, the player will determine the distribution of green balls
3) The player will execute the strategy without considering middle results. The plan and strategy is decided since the beginning and every situation was identified and handled in the planning.

#### Purely effectual approach

1) The player do not care about the number of balls inside the bucket
2) The player will take “N” balls at a time and determine the distribution based on the results obtained.
3) The player will take batches of “N” balls as long as the majority of the balls are green (positive distribution).
Mixed strategy (effectual and causal)

1) The player does not care about the number of balls inside the bucket.
2) The player will take n balls initially which he/she will use for calculating the distribution. And also, the player will see if other players have similar, better or worse distributions.
3) If others players has a distribution that is:
   a) Better: the player needs to get more balls
   b) Worse: the player stays as it is
   c) Similar: the player strategy will depend on other players moves

The reader can see that the Nash equilibrium will be reached when all the players stay constant with their strategy. This situation will make that the strategy that the player is following is the best, knowing the other players strategy and results.

This explanation can be ported to the entrepreneurship environment. The analogy between the game and entrepreneurship:

- Bucket is analogous to Market/Industry
- Balls are the different customers segments
  - Green balls are favorable segments
  - Red balls are not favorable segments (addressing those is a penalty in your strategy)
- Players stands for the entrepreneur’s company and other companies in the same market

Thus, imagine an entrepreneur who is starting a new company in an existing market:

Purely causal approach

1) The entrepreneur estimates the number of customers according to an analysis of the market.
2) Based on other companies’ performance before him/her and the market distribution, the entrepreneur will determine what strategy should be followed.
3) The entrepreneur will execute the strategy without considering middle results. The plan and strategy is decided since the beginning and every possible situation was identified and handled in the planning.

Purely effectual approach

1) The entrepreneur does not care about the number of customers in the market, initially.
2) The entrepreneur will address “N” customers segments at a time and determine the distribution based on the results obtained (validated knowledge).
3) The entrepreneur will take batches of “N” customers as long as the majority of the customers segments are favorable (positive distribution). This resembles to the exploration nature of the effectual approaches. As long as the obtained results are favorable, the entrepreneur will continue executing the same strategy.
**Mixed strategy (effectual and causal)**

1) The entrepreneur does not care about the number of customers in the market initially.

2) The entrepreneur will address “N” customer segments initially which he/she will use for calculating the market distribution. And also, the entrepreneur will check if other companies have similar, better or worse distributions than himself/herself.

3) If others companies has a distribution that is:
   a) Better: the entrepreneur can try to get more customers (favorable segments)
   b) Worse: the entrepreneur can exploit the current situation
   c) Similar: the entrepreneur strategy will depend on other companies strategies

In the mixed strategy, the entrepreneur as a player will consider different reasoning:

- Effectual reasoning: applied in the beginning. Exploration can be used to handle uncertainty and gain validated knowledge. In the initial phases the future is not predictable (not enough data and changing rapidly what the entrepreneur knows). Instead, the entrepreneur can focus on control the future.

- Causal: applied in later stages when the uncertainty is lower. The entrepreneur understands the situation of the market and the competitors so we can predict the future more accurately and include it in our strategy.

As an organization the goal is to ensure that the followed strategy is the one that brings most value (“best response”, see section 2.1.1 Best response) to the organization and it is the one that even knowing the other players strategies I will still maintain my strategy.

Nash equilibrium will appear in the market when all the companies present in it are following their “best responses”.

This contains an interesting consequence, a company strategy is always influenced by the strategy of other companies.

### 3.3.4 Initial theory evaluation

To evaluate this theory and demonstrate that Nash is present in current theories, it is applied to a startup in different market contexts and also, contrasted with more established theories to gain credibility.

In this thesis four market scenarios are explained for simplicity. It is understood that the combination of factors lead to an unlimited number of market scenarios in reality. However, the four scenarios presented can represent the main groups and hence is considered a valid analysis.

#### 3.3.4.1 STARTUP CREATES A NEW MARKET

In this scenario the startup unveils a new technology or in general lines, it creates something that did not exist before. This is probably the most uncertain scenario as there is nothing previously done that can serve as a reference.
or guidance to the new startup.

A new market is emerging if the entrepreneur manages to validate the business model.

What strategy can the entrepreneur follow in this scenario?

Let’s apply Nash to see what can be seen as the right balance between effectual and causal reasoning. The entrepreneur is moving under a lot of uncertainty in this scenario along all the phases of the startup so probably for the start effectual reasoning fits well for finding validated knowledge.

Even when validating the business model for a few adopters, it will still remain a lot uncertainty as the market is new and nobody has any previous experience. Effectual methodologies can be applied in this context and no other strategy inputs will be taken, as there are no competitors in the market so the strategy according to Nash will be dependent on the evaluation of the company itself.

*The balance between exploration and exploitation (best response) in this scenario is uniquely dependent on the internal evaluation made by the company.*

### 3.3.4.2 STARTUP ENTERS IN AN EXISTING MARKET

In this scenario a startup tries to gain market share from an established market. Common examples of this scenario appear when a startup manages to reduce the production costs of a certain product or add newer capabilities that make more attractive the product in the market.

This is usually achieved by incremental innovation. I will not define incremental innovation here, but the reader can understand it as a type of innovation that occurs when small improvements are done in a product to maintain competence during time (usually as a result of exploitation methodologies).

This is probably the most studied scenario and the one that is really dependent on the circumstances that the company strives.

*The balance between exploration and exploitation (best response) in this scenario is directly dependent on the internal evaluation and the competitors’ strategy.*

### 3.3.4.3 STARTUP DISRUPTS A MARKET

In 1997, Clayton M. Chistensen published a book called *The Innovators Dilemma* in which he coined the term “disruptive innovation.” He describes it as:

"*Generally, disruptive innovations were technologically straightforward, consisting of off-the-shelf components put together in a product architecture that was often simpler than prior approaches. They offered less of what customers in established markets wanted and so could rarely be initially employed there. They offered a different package of attributes valued only in emerging markets remote from, and unimportant to, the mainstream.*" (Christensen, 1997)
He could not find an answer to this dilemma and it was in his second book, “The Innovator’s Solution” where he explains that a valid solution is to spin-off a sub-unit with exploratory capabilities to detect and adapt firms quicker to a fast-pace environments. There have been also other attempts to solve the innovator’s dilemma and those have been explained in this thesis, ambidextrous organizations or punctuated equilibrium are claimed to be valid solutions as well (O’Reilly, 2007).

The Nash equilibrium theory represents a way to measure that an organization has the right balance. These theories explain the need for a balance between them but where is the balance in those is another question. Nash equilibrium and the notion of best response help to point whether this equilibrium is balanced or not depending on the market and competitors situation.

In case of disruptive innovation, the product’s adoption occurs much faster than in other cases due to the appearance of a new technology or business model.

Analyzing the results obtained by Christensen and applying the Nash theory on them. One can detect that a disruptive technology make a market unbalanced when it is introduced. An established firm in a market will be forced to modify its strategy when analyzing the competitors’ strategies and how the market is reacting to them. This company will look for the new “best response” taking into account that the situation has changed. Note that the “best response” can still be the same strategy that the company was following, however, there needs to be an effort to revaluate it and consider the new conditions.

The balance between exploration and exploitation resides on the internal evaluation of the company and external factors coming from the market and competitors.

3.3.4.4 STARTUP RE-CREATES AN EXISTING MARKET UNDER OTHER CONDITIONS

THIS CASE IS SIMILAR TO CREATE A NEW MARKET. THIS CAN HAPPEN WHEN APPLYING FRUGAL INNOVATION (ZESCHKY ET AL., 2011) OR APPLYING A PRODUCT FORM
ONE INDUSTRY TO ANOTHER. APPLYING THE THEORY IN THIS CONTEXT DOES NOT MAKE ANY DIFFERENCE THAN THE CASE PRESENTED IN SECTION

3.3.4.1 Startup creates a new market from effectuation/causation balance point of view.
4. Conclusion

Sarasvathy made evident the differences in the decision-making processes between managers of established companies and entrepreneurs. This thesis relates her theory with widely accepted frameworks and other available theories in the literature that are used by entrepreneurs and by big corporations.

Many entrepreneurs tend to start from effectual reasoning, in which they need to find a valid business model, in contrast with managers who are given a specific task to perform in the overall process of a company. There is a substantial difference in the reasoning processes between the two of them. The entrepreneur needs to find the tools and components to reach a validated business model. The manager needs to minimize the tools and components needed to reach a particular goal.

BMC and LS are two frameworks widely utilized by entrepreneurs nowadays. These two are mapped and analyzed against Sarasvathy’s theory, determining that BMC and LS methods contain a high degree of effectual reasoning behind.

The more traditional planning strategy is also presented in the thesis, where two representative frameworks are analyzed against Sarasvathy’s theory, determining that these frameworks are completely causal.

The LS method is used to add the causal reasoning and create an extension to the theory that can be applied to later phases of a startup, once the business model is validated. The main execution loop used in the LS method is enriched with a causal (exploitation) loop that allows us to explain and raise the need of incorporating this line of thinking over time. Having two loops (exploitation and exploration) raises the need of finding a balance between them.

Effectuation and causation are related to the terms exploration and exploitation. Exploration and exploitation has been studied before and is described in academic literature as well as best sellers like “The Innovator’s Dilemma” (Christensen, 1997). The relation between them is useful for developing a further analysis as those studies empirically demonstrated the value of having equilibrium. This equilibrium can bring the organization a sustainable business model in the short and long term, and hence, organizations that manage to implement it have higher chances of succeeding.

Ambidextrous or punctuated equilibrium has been proposed to reach equilibrium in the existing literature. However, there are no studies that analyze where is the right equilibrium and how to detect if a company has achieved it. This question is addressed in the thesis and equilibrium is tackled from the game-theory perspective. The Nash equilibrium is proposed as a way to correctly balance the exploration and exploitation methodologies. Using Nash to balance between exploration and exploitation implies also that:

*The company’s balance between exploration and exploitation is not only influenced by the company situation but also from the market and competitors’ strategies.*

This means that the balance will vary along the different phases of a startup. It will begin being entirely effectual and it will evolve to contain more causal reasoning over time.
Furthermore, Nash theory explains that the change in the market or in the competitors’ strategies might affect this balance. This change in the balance could lead to a change in the present company strategy.
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