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Entrepreneurial strategy and the role of experimentation for startup ventures

A case study of the strategic processes of initial strategy formation and the processes of strategic change in startup ventures

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Purpose of the Thesis

The purpose of the thesis is to *investigate the role of experimentation and commitment in strategic processes for startup ventures*. The thesis explores strategic processes in startup ventures and examines how entrepreneurs use experimentation to learn about a given strategic trajectory, and how the costs and commitments created by experimentation affects the strategic process. The authors do this by conducting a multiple-case study of five Norwegian startup ventures that have conducted significant strategic changes in their lifetime.

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Preface

There are few journeys more famous than the Norwegian Fram Expedition led by Roald Amundsen in the race for the south pole on the Arctic continent. Essential for the expedition was all the preparation and planning in advance. In this, Robert F. Scott, leading the competing expedition, had failed to succeed with fatal consequences.

The importance of preparation and planning in order to reach a goal, can not be expressed better than by Amundsen himself. “I may say that this is the greatest factor - the way in which the expedition is equipped - the way in which every difficulty is foreseen, and precautions taken for meeting or avoiding it. Victory awaits him who has everything in order - luck, people call it. Defeat is certain for him who has neglected to take the necessary precautions in time - bad luck, people call it.” (Amundsen, 1912)

These thoughts can be found in the academic literature, describing how companies use strategic planning and analysis to achieve success. However, we ask, how can one plan and prepare for the strategic journey that lies ahead for a startup venture, operating under conditions of fundamental uncertainty and limited resources and lacking a clear goal?

As three aspiring entrepreneurs, the authors want to explore these questions, hoping to shed light over the strategic journey of startup ventures, and the strategic processes of initial strategy formation and strategic change that lies within them.

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Abstract

This thesis examines the role of experimentation and commitment in strategic processes in startup ventures. The thesis builds on theory from the field of entrepreneurial strategy and, especially the work of Gans, Stern, and Wu (2016). Entrepreneurial strategy is an emerging field building on a wide body of research from several interrelated fields such as strategy in the face of uncertainty, entrepreneurship in established organizations, and decision-making, among others. Much of the established theory within the field of strategic management primarily concerns established companies, meaning that its practical utility is limited under the conditions in which startup ventures operate; the field of entrepreneurial strategy aims to close this gap. Startup ventures operate under conditions of uncertainty and resource constraints. To partially resolve some of this uncertainty, start up ventures engage in experimentation in order to learn about strategic alternatives and the value of their underlying idea.

The purpose of this thesis is to examine the role of experimentation and commitment in strategic processes in startup ventures. To fulfill this purpose, the authors have conducted a multiple-case study of five startup ventures. We have used a process approach where events are identified from each startup venture based on the interviews with founders and secondary data sources. From these, narratives and visual maps were created for each of the startup ventures, describing the formation and development of a strategy for each case company. The result was a rich and contextual process that highlights the complexity inherent to entrepreneurial strategy. This process reveals experimentation activities, commitments created by experimentation, and the costs incurred by it. The cases were compared along multiple dimensions, and grouped in order to highlight differences and similarities across cases.

Our findings indicate that entrepreneurs engage in experimentation for a variety of reasons; a desire to learn more about the market, internal discussions, low traction or mentoring from professionals all triggered experimentation activities. However, the purpose of the experimentation across cases was primarily in order to obtain feedback, allowing them to adapt and improve product-market fit before market entry. Our findings also reveal four types of costs related to experimentation; intrinsic cost, product development cost, appropriability cost, and stakeholder commitments, and that complementarities between these costs exist. This has significant implications for the practitioner, revealing the need to actively consider these costs as a part of a strategic process.

We have inductively developed the ‘experimentation cycle’ from our analysis. This novel framework describes the process of experimentation, feedback, and commitment. By creating an integrated framework that accounts for the costs and commitments of experimentation, we contribute to both research and practice, presenting several opportunities for future research.

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This master's thesis was written by three master students studying at NTNU School of Entrepreneurship, as part of the Norwegian University of Science and Technology. This thesis is the finalization of their degrees as Master of Science, as part of the program at the Department of Industrial Economics and Technology Management.

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1. Introduction

When Stewart Butterfield and his team founded Tiny Speck in 2009, they set out to create a Massive Multiplayer Online Role-Playing Game called Glitch. The game was set in a 2D fantasy world which Butterfield himself described as “Monty Python crossed with Dr. Seuss on acid” (Shanh, 2018). After the game failed to gain more than a niche following after its launch in 2011, the team decided to shut down the game and instead focus on an internal tool they had built for themselves during the development of Glitch. The “Searchable Log of all Conversation and Knowledge”, or Slack, was packaged as a productivity and communication tool for teams - and its success was immediate, turning the new Slack Technologies into the world’s fastest-growing startup. By 2017, Slack was valued at \$5.1 billion.

The startup world is full of stories of significant strategic changes like Slack. Although strategy and entrepreneurship has commonalities, strategy does not always comply with the needs of startup ventures. A strategy is often thought of as meticulous planning and deliberate execution of a clearly defined path, while entrepreneurship is often viewed as wild-eyed opportunism, requiring startup ventures to learn and adapt rapidly (Collis, 2016). Could Slack have become the massive success it is today if they had not diverted from their initial strategy? Do startup ventures need a strategy or do a strategy naturally emerge over time?

Eric Ries popularized the term pivot to describe this type of radical strategic change when he published his international bestseller “The Lean Startup” in 2011. While pivots are now one of the most widely known and applied concepts in the startup community, it clearly lacks a foundation in academic literature (O’Connor & Klebahn, 2011; Penenberg, 2012). In this thesis, a pivot is defined as a distinct type of strategic change (Hampel, Tracey & Weber, 2019) that differs in two important aspects. Firstly, it concerns “an organization in its early years of existence” (Zimmerman & Zeitz, 2002, p. 414) i.e. a startup venture. Secondly, these startup ventures are resource-constrained, and its very survival often hinges on executing the pivot successfully once the decision to pivot has been made (Drori et al., 2009). Despite the popular use of the term and its prevalence in the practice of entrepreneurship, pivots are rarely studied as a process (McMullen & Dimov, 2013; Grimes, 2018; Hampel, Tracey & Weber, 2019). This thesis is motivated by a desire to better understand the forces that drive these strategic processes in startup ventures and how entrepreneurs test their assumptions through experimentation. A strategic process is defined as all the events that led up to and happened during initial strategy formation and strategic change.

Startup ventures face a unique set of challenges that diminish their chance of success and survival (Ganco, Holcomb & McDonald, 2016). This raises the following questions; *How can entrepreneurs make good strategic choices when faced with fundamental uncertainty and limited*

resources? How does a strategy emerge in startup ventures? How does the initial choice of strategy impact the startup venture's ability to execute strategic change? Entrepreneurial strategy is an emerging field that seeks to answer these questions by building on a wide body of research from several interrelated fields such as entrepreneurship, strategic management, economics, and organizational theory. At the core of entrepreneurial strategy is how a startup venture can test and build sustainable value creation and capture mechanisms in the face of uncertainty (Gans, Stern & Wu, 2016). Kerr, Nanda, and Rhodes-Kropf (2014) suggests that learning through experimentation is the heart of these processes, and that entrepreneurial strategy is largely formed by this learning, as well as the commitments that come with this process. This view is in stark contrast with e.g. Lean Startup Approaches, which postulates that commitment-free learning is possible and does not consider the cost of experimentation, the commitments and path dependence created by conducting experiments. The authors adhere to the definition of Ghemawat (1991) of commitment, as “the tendency of strategies to persist over time.”

The purpose of the thesis is to investigate the role of experimentation and commitment in strategic processes for startup ventures.

To address the purpose of this thesis, the following research questions have been formulated:

RQ 1 - How do entrepreneurs engage in experimentation during strategic processes, and how does this experimentation affect the strategy process?

RQ 2 - How does the cost of experimentation and commitments affect strategic processes in startup ventures?

Entrepreneurial strategy is not simply a once-and-done concept; it is by its very nature a transitory and continuous evolution in search of a sustainable competitive advantage over time (Gans, Stern & Wu, 2016). Recently there has been a shift towards studying entrepreneurship as a process. Rather than attempting to dissect a story into separate attributes (variance theory), the entrepreneurial journey needs to be studied (process theory), with all the discrete events that comprise the history of the startup venture (McMullen, 2015; McMullen & Dimov, 2013). In other words, process theory seeks to explain the evolution of a phenomenon through the interaction of events and activities that may be difficult to generalize and encapsulate in variables. Studying startup ventures who have undergone a pivot presents an excellent opportunity to better understand the process of how strategies form and evolve in startup ventures, with all the discrete events and factors that might affect it.

1.1 Relevance for the practice of entrepreneurship

Understanding how startup ventures balance experimentation and commitment to learn more about a strategic trajectory without dedicating too much resources can be valuable for a nascent entrepreneur. This understanding is a real-life challenge that organizations face, and as stated by Van de Ven (2007); being able to address real-life problems in research, and not only literature gaps, makes research more relevant and grounded. It is essential that theories are problem driven, meaning that in some fashion it is addressing a problem of direct or indirect relevance for practice, rather than filling theoretical gaps simply because they exist (Corley & Gioia, 2011).

While the focus of this master thesis will be on how startup ventures use experimentation during strategic processes to learn, it is important to highlight the implications for established organizations that need to adapt to a rapidly changing environment as well. The need to be adaptable has increased dramatically as the global economy has become more complex and interconnected, allowing “black swan”¹ events and technological innovation to quickly propagate, meaning that incumbent firms increasingly need to manage uncertainty (Tece, Peteraf & Leih, 2016). “The world around us and the environment in which different organizations are working is becoming progressively complicated day after day. In order to survive, organizations need to adapt themselves to the new changes and developments” (Alipour et al., 2011, p. 1). Even though the theories developed in this thesis certainly has its implications in real-life, the authors have also found gaps in the literature that needs to be filled to be able to examine the strategic processes in startup ventures thoroughly.

1.2 Gaps in the literature

While there is a wide body of literature concerning strategy in established organizations, the concept of entrepreneurial strategy is just beginning to emerge as a distinct concept. There is growing evidence that entrepreneurs face a unique set of challenges when starting a startup venture, characterized by fundamental uncertainty, limited resources (Collis, 2016) and freedom of choice (Ganco, Holcomb & McDonald, 2018; Gans, Stern & Wu, 2016). Some evidence underscores that startup ventures resolve some of this uncertainty by attempting to learn about a given strategic trajectory by experimenting with it, testing an element of its value creation and capture hypothesis (Gans, Stern & Wu, 2016). By experimenting, and not fully committing, startup ventures aim to keep commitments tentative and test assumptions in order to learn from and adapt to the response without dedicating too many resources (Quinn, 1978; 1980).

Simultaneously there is a tension between learning from experimentation and commitment to a given strategy that must be balanced when making decisions (Gans, Stern & Wu, 2016; Contigiani, 2018). This tension, and how entrepreneurs balance it during strategic change

¹ A completely unprecedented and unexpected event with major consequences, such as the dot-com bubble of 2001.

processes is a topic that has received little focus in entrepreneurial research, and the authors will try to clarify the relation entrepreneurs has to this tension. The underlying logic of how entrepreneurial strategy is formed and evolves over time is not yet understood. Lastly, there is an evident lack of process studies regarding strategy; a comprehensive literature review on 227 studies on strategy process research conducted by Hutzschenreuter and Kleindienst (2006), recommends more multiple-case design studies to provide more insight into the actual strategy process in organizations, offering an organic perspective.

1.3 Contribution

This thesis addresses the gap in the literature concerning the tension between experimentation and commitment and contributes to a better understanding of the complex real-life phenomenon of strategic processes. This process study represents a research effort into dynamic entrepreneurial strategy, as one of the first of its kind. Based on their recommendation for further research, we also investigate how Gans, Stern and Wu's (2016) framework on entrepreneurial strategy applies to startup ventures who have already committed to one or more strategic choices.

With the recent surge in popularity of Lean Startup Approaches, agile development and other forms of experimentation-based entrepreneurship, research on entrepreneurial strategy and the processes that drive strategic change have never been more relevant.

1.4 Structure of the thesis

The thesis is structured in the following manner; Chapter one explains the practical grounding, purpose, research questions, and contribution of the thesis. The main theoretical concepts investigated in the thesis are also briefly explained.

Chapter two elaborates on the theoretical framework used, and also examines what gaps there is in the literature today, and how current literature explains the strategic change taking place in startup ventures. The concepts of entrepreneurial strategy will be thoroughly explained, and the development of the term will also be emphasized.

In chapter three, the method chosen for acquiring, coding, and analyzing the data is laid forth. The process will be explained step by step, and at the end of the chapter, the limitations of the method are discussed.

In chapter four, the authors present the case companies to give the reader some background information about the cases, as well as the visual maps of each company. The findings for each case are presented, divided into experimentation, feedback, and commitment. In chapter five, we present our cross-case analysis and answer the research questions.

Chapter six contains a discussion of the findings, followed by a conclusion and some implications for practice in chapter seven. In chapter eight, the limitations of the findings are presented.

2. Theory

Pivots are a specific type of strategic change (Hampel, Tracey & Weber, 2019) that differ significantly from strategic change in established organizations. Pivots concern newly established startup ventures where leaders engage directly with the small team of people who belong to it to transform the venture (Garud, Gehman & Giuliani, 2014). Secondly, these ventures are resource-constrained, and its survival hinges on successfully executing the pivot (Drori et al., 2009). This vitality is in contrast with strategic change that has been studied in established organizations, where the success of the change process may not be a matter of survival, and these firms can put contingencies in place for multiple outcomes. While more research is beginning to emerge on pivots, such as Grimes (2018), on identity-based constraints for pivots, and Hampel, Tracey, and Weber's (2019) process study on managing stakeholder relationships during pivots, there is a large gap between the practice of pivoting and its treatment in the literature.

Given the purpose of this thesis, which is to better understand the role of experimentation and commitments in startup ventures, the authors need to apply the theory that is specific to these ventures. In this section of the thesis, the authors will explore the main concepts of entrepreneurial strategy as well as their academic roots. While the literature is not unified into a distinct literature stream - entrepreneurial strategy as a distinct concept is founded in a broad and rich research history on the descriptive schools of strategy.

There have been a few attempts at building a holistic framework for entrepreneurial strategy such as the work of Gans, Stern, and Wu (2016) and Gans, Scott & Stern (2018). Intending to unify research and practice, it builds on a variety of interrelated research on strategy, entrepreneurial learning, and experimentation. The goal of this work is to define and delineate the scope of entrepreneurial strategy, as well as clarifying the set of choices and complementarities that shape entrepreneurial strategy. This recent work sets the stage for further research on the topic, as well as shaping the discussion on the field of entrepreneurship research, which the authors will return to later.

The authors attempt to align the different perspectives on entrepreneurial strategy and the research that has shaped the state of the field today, with a particular focus on experimentation. In the last part of this section, the authors present some of the literature on entrepreneurial process research and its implications for research on pivots and entrepreneurial strategy.

2.1 Entrepreneurial strategy as a distinct concept

The theory presented in this chapter is mainly concerned with strategy in the context of startup ventures. According to Gans, Stern & Wu (2016), the role of entrepreneurial strategy is to help

founding teams make active choices about which internal capabilities to build, and how to position themselves within a marketplace. They define entrepreneurial strategy as “the set or sequence of choices that a startup venture makes in order to test a value creation and value capture hypothesis” (Gans, Stern & Wu, 2016), implying that strategy in the context of entrepreneurship is pliable and fluctuates with the entrepreneurial firm’s activities. This is the definition of entrepreneurial strategy which will be used throughout this thesis, building on a wide body of literature within entrepreneurship, strategic management, and organizational theory.

Murray (1984) introduced the concept of entrepreneurial strategy as a “subset of strategy in general, being specifically focused on strategies of fundamental change” (Murray, 1984, p. 2), allowing firms to establish themselves in a configuration that will allow it to survive and prosper in its chosen environment. Entrepreneurial strategy is based on the premise that startup ventures differ from other firms in significant ways and that theories and prescriptions derived from studying strategy in established firms may not apply to entrepreneurial firms (Ganco, Holcomb & McDonald, 2016; Ireland, Hitt & Sirmon, 2003). Entrepreneurial strategy is an emerging field, building on an extensive body of research from several interrelated fields, including, but not limited to, research on strategy in the face of uncertainty (Rivkin & Siggelkow, 2006; Gavetti & Rivkin, 2007), the role of entrepreneurship in traditional firms (Kuratko & Audretsch, 2009) and experimentation and learning in entrepreneurship (Contigiani, 2018; Kerr, Nanda & Rhodes-Kropf, 2014). Besides, entrepreneurial strategy has also been influenced by literature on strategy and decision-making in established organizations (Dess, Lumpkin & Covin, 1997; Eisenhardt & Zbaracki, 1992).

2.2 Roots of Entrepreneurial Strategy

First, a step back to the academic foundations of what is a relatively novel concept in the literature. In a review of the literature on strategy processes, Mintzberg & Lampel (1999) identify ten different schools of strategy formation, identifying three prescriptive schools of thought and seven descriptive. Of these, the most common on business school curriculums around the world is the “Positioning” school of thought, championed by Michael Porter in the 1980s. With its academic foundation in economics, the positioning school is highly analytical and oriented towards planning. This approach has been popular among academics and consultants as the strategy term is easily deconstructed into steps, checklists, and models which are easy to communicate, publish, or sell to clients. Champions of these analytical and other prescriptive approaches to strategy view the world as controllable and comprehensible, which can be subject to rational analysis, and strategy itself is deliberate (Mintzberg & Lampel, 1999).

This approach is in stark contrast to the descriptive schools of thought which take the position that the world is mostly unpredictable and confusing (Mintzberg & Lampel, 1999), implying that

strategy formation is a natural process that happens over time. Of the descriptive schools, what Mintzberg & Lampel (1999) identify as the “Learning” school of strategy formation is the view that resonates most closely with the concept of entrepreneurial strategy. In this view, strategy is emergent and formulation and implementation intertwine, focusing on experimentation and action in order to learn more about a particular strategic alternative². Strategies, both deliberate and emergent are a result of a set of decisions being made among many alternative choices (Mintzberg & Waters, 1985), and so the question can be raised - what are the conditions and constraints that shape these decisions?

The work of March (1978) raised the issue of bounded rationality in decision-making theory, marking a shift towards a more descriptive theory of decision-making, drawing insight from sociology, organizational theory, and cognitive psychology rather than econometrics and game theory (Cohen, March & Olsen, 1972). Theorists like Henry Mintzberg drew on these insights and more in his contributions to the field of strategy - reframing strategy formation as descriptive, and defining strategy as a continuum between deliberate and emergent strategies (Mintzberg & Waters, 1985), drawing focus away from the planning and analytical aspects of strategy (Mintzberg, 1994). In his work on strategic change, Quinn (1978; 1980) proposed the notion of logical incrementalism - a type of emergent strategy approach where “the processes used to arrive at the total strategy are typically fragmented, evolutionary and largely intuitive.” Key elements to this logical incrementalism are to keep commitments tentative and test assumptions in order to learn from and adapt to the response.

Mintzberg defined a firm’s realized strategy as “a pattern in a stream of decisions” (Mintzberg, 1978, p. 935), implying that strategy evolves over time and is subject to a variety of factors that shape it. Scholars of the descriptive schools of strategy tend to emphasize the fundamental uncertainty surrounding the strategy process, highlighting the difficulty of applying analytical frameworks to predict that which is in principle unknowable. Studying the process that leads to this pattern in entrepreneurial ventures can contribute to building a better understanding of how both entrepreneurial firms and established organizations make strategic decisions under these conditions of uncertainty and resource-constraint.

2.3 Premises of Entrepreneurial Strategy

As part of the descriptive branch of strategy research, entrepreneurial strategy partly defined by the intrinsic qualities of being a startup venture. A startup venture faces significantly different internal and external conditions than established firms do (Ganco, Holcomb & McDonald, 2016), laying the foundations for entrepreneurial strategy as a distinct form of strategy. Since startup ventures tend to have few established systems, culture or historical legacy, they are usually

²Entrepreneurial strategy is defined as a particular value creation and value capture hypothesis, and a strategic alternative refers to one entrepreneurial strategy out of a choice set of many possible.

unconstrained by their previous actions, meaning that they have fundamental freedom of strategic choice compared to established organizations (Gans, Stern & Wu, 2016). They also face significant resource constraints. Startup ventures tend to have few resources compared to established firms, and must carefully manage, conserve and deploy the resources they have (Collis, 2016), meaning that these constraints usually prevent the entrepreneur from pursuing more than one strategy at any given time (Gans, Stern & Wu, 2016). Besides, startup ventures face a great deal of uncertainty surrounding the commercialization of their idea. To resolve some of this uncertainty, startup ventures often attempt to learn more about a given strategic alternative by experimenting with it by testing an element of its value creation and capture hypothesis (Kerr, Nanda & Rhodes-Kropf, 2014).

2.3.1 Uncertainty

Strategizing under conditions of known probabilities is mainly concerned with managing risk (Teece, Peteraf & Leih, 2016; Klein, Barney & Foss, 2012), but entrepreneurial processes happen under conditions dominated by uncertainty (Sarasvathy, 2001). The uncertainty plays a fundamental role in entrepreneurial strategy (McKelvie, Haynie & Gustavsson, 2011), and is distinguished from the concept of risk since uncertainty is not measurable (Knight, 1921). In situations characterized by risk, the possible outcomes and probabilities are known, in contrast with fundamental uncertainty where neither the outcomes or their probabilities are known (ibid.). This fundamental uncertainty implies that there is no quantifiable knowledge about a future situation, making it essentially unpredictable (Knight, 1921). McMullen and Shepherd (2006, p. 133) go as far as to state that “uncertainty constitutes a conceptual cornerstone for most theories of the entrepreneur.” This view is mirrored in the literature on entrepreneurial strategy (Ireland, Hitt & Sirmon, 2003), as well as entrepreneurial decision-making under uncertainty, specifically Sarasvathy’s (2001) seminal work on effectuation.

Milliken (1987) builds on and refines the approach to managing uncertainty by defining different types of uncertainty an individual may experience, specifically state, effect, and response uncertainty. Further, he suggests that research on uncertainty should be focused on how the entrepreneur interprets the specific types of uncertainty (Milliken, 1987; McKelvie, Haynie & Gustavsson, 2011). Response uncertainty is related to attempts at understanding what response options are available to the organization and what the value or utility of each might be (Milliken, 1987), implying that it, in particular, has salient implications for strategizing in entrepreneurial firms. According to McMullen & Shepherd (2006), uncertainty in the context of action falls entirely within the domain of response uncertainty, implying that entrepreneurs need methods in order to at least partially resolve this uncertainty. While the research of McMullen & Shepherd (2006) is focused on the decision-making of the individual entrepreneur, it appears to be applicable to the organization as an entity as well (McMullen & Shepherd, 2006). The work of McKelvie, Haynie, and Gustavsson (2011) provide empirical evidence, based on 2800 decisions,

that different types of uncertainty impacts entrepreneurial decision-making and behavior, supporting Milliken's tenet that not all uncertainty is created equal.

2.3.2 Strategy in the context of uncertainty

The literature widely agrees that uncertainty plays a fundamental role in strategy processes for startup venture (Venkataraman, 1997; Foss & Klein, 2005), as well as in established organizations (Teece, Peteraf & Leih, 2016). The literature on strategic management presents several potential frameworks and solutions to handle this fundamental uncertainty. Teece, Peteraf, and Leih (2016) argue that building strong dynamic capabilities in the firm to foster organizational agility is one way to manage this uncertainty. Morris, Kuratko, and Covin (2010) suggest creating a dynamic dominant firm logic that promotes entrepreneurship through the qualities of agility, flexibility, creativity, and continuous innovation throughout the firm. While this work touches on some of the same topics as entrepreneurial strategy, such as decision-making under uncertainty and management of internal capabilities (Teece, Pisano & Shuen, 1997), it is mainly concerned with managing innovation in established firms (Jalonen, 2011) and there have been few attempts to connect the literature on entrepreneurial strategy in established organizations and that of startup ventures (Kuratko & Audretsch, 2009). More recently, experimentation has been suggested as the dominant method entrepreneurs utilize in resolving uncertainty (Kerr, Nanda & Rhodes-Kropf, 2014; Contigiani, 2018; Gans, Stern & Wu, 2019)

2.3.3 Experimentation

The value of experimentation and learning in the process of entrepreneurship has been widely discussed in the literature (McGrath & MacMillan, 1995; Ries, 2011; Kerr, Nanda & Rhodes-Kropf, 2014). Given the conditions of freedom and constraints, entrepreneurs actively need to learn about their strategies in order to adapt to ambiguous environments so that they can select and exploit the most valuable opportunities (Gavetti & Rivkin, 2007). This takes its roots from March's (1991) seminal work on organizational exploration versus exploitation but within the context of an entrepreneurial firm (Contigiani, 2018). March (1991) defines exploration as the search for new opportunities, experimentation, and variation - linking the concept of exploration with entrepreneurial orientation, characterized by being innovative, proactive, and risk-taking. Kerr, Nanda & Rhodes-Kropf (2014) suggest that entrepreneurship is fundamentally about experimentation as information needed to achieve success cannot be deduced or known in advance; instead, it must be invested in through experimentation. As these experiments provide information about the likelihood of success, entrepreneurs and stakeholders gain information about whether to continue the project (Kerr, Nanda & Rhodes-Kropf, 2014).

Contigiani (2018) defines experimentation in the context of entrepreneurship as the disclosure of an incomplete product prior to market entry with the purpose of obtaining market feedback in

order to revise their value proposition in preparation for market entry. The authors will adhere to this definition and refer to this as market experimentation. The authors define technological experimentation as experimentation activities that allow the entrepreneurs to explore new applications for the technology, new production methods, or to learn more about the underlying technology.

Experimentation is an effort primarily devoted to learning, which is consistent with previous literature in strategic management (Contigiani, 2018; Murray & Tripsas, 2004). As such, experimentation is a strategic move that startup ventures can take to learn about the market, controlling both whether to experiment or not, as well as the timing of the experiment. An often overlooked aspect of implementing experiments in early-stage ventures is the partial commitment such an experiment can cause. Gans, Stern & Wu (2019) suggest that by using experimentation to test whether or not to proceed with a specific strategic alternative, startup ventures run the risk of incurring significant opportunity costs from the process of experimentation itself. Gans, Stern & Wu (2019) suggest that entrepreneurs can use commitment-free information to build a set of viable strategies and selecting which to learn more about by experimenting with them. This process can be framed as a continuum between action and optimization, where you have picking any viable strategy and sticking with it on the one hand, and on the other - to search and explore all options for commercialization before implementing it, which would be global optimization (Gans, Wu & Stern, 2019).

Experimentation affects performance through the channels of learning and appropriability (the firm's ability to protect its technology and risk of imitation) (Contigiani, 2018). In the context of early-stage ventures, learning drives value creation and appropriability drives value capture. Learning through experimentation is one specific form of learning, and is characterized by being experiential as well as intentional. Contigiani (2018) argues that while ventures may also learn about their technology, the learning obtained through experimentation is primarily about the wants and needs of the target customers group(s). The process of experimentation is designed to improve the product-market fit by reducing the distance between the current product and the desired product. The knowledge obtained through experimentation has to be incorporated into the product through a process of adaptation (Levinthal, 1997). This adaptation bears with it a cost, which could be product change, reputational or organizational. However, since experimentation only requires a partial commitment, and occurs prior to market entry, adaptation costs are lower than at later stages.

By seeking market feedback, ventures are also at risk of misappropriation, as they are essentially providing information on their idea or technology, thus putting themselves at risk of imitation. There is, therefore, an inherent tension between learning and appropriability (Contigiani, 2018).

This tension can partially be resolved by seeking intellectual property (IP) protection, both formal and informal (Hall et al., 2014).

2.3.4 Cost of experimentation in the context of uncertainty

Key to the approaches listed in the section above is the willingness to, and capability of, a startup venture to engage in experimentation to learn more about a given strategic alternative. However, experimentation comes at a cost, and this cost of experimentation has a significant impact on how much firms experiment (Kerr, Nanda & Rhodes-Kropf, 2014). The cost of experimentation is both linked to the cost of product development and distribution, which is most easily illustrated by the software sector - building and circulating early versions of a product is particularly cheap. For industries where development costs are higher, experimentation is more challenging. This cost of experimentation has affected the amount of venture capital investments as evidenced by Ewes, Nanda, and Rhodes-Kropf (2018), where early-stage investors are biased towards startup ventures where initial experiments can generate positive information early on, allowing them to update the expected value of their investment quicker.

Contigiani (2018) suggests an often overlooked cost of experimentation is linked to the threat of imitation, and that startup ventures will choose to experiment when the learning benefits exceed the imitation costs. He also finds that firms are less likely to experiment when they operate in a weaker Formal Intellectual Property environment. Lower costs of experimentation for e-commerce startup ventures have also been shown to be strongly correlated with the massive increase in crowdfunding campaigns and angel investors (Kerr, Nanda & Rhodes-Kropf, 2014).

In recent years, this concept of learning through experimentation has exploded in popularity in the practice of entrepreneurship, popularized through practical tools such as the Business Model Canvas and Lean Canvas (Osterwalder & Pigneur, 2010; Maurya, 2012). Besides, hypotheses-based entrepreneurship has become highly influential on practitioners of entrepreneurship through conceptual tools such as Lean Startup Approaches (LSA) and is widely used for validating key hypotheses about a startup venture's business model (Ries, 2011; Blank & Dorf, 2012). LSA focuses on learning and experimentation as an entrepreneurial process to develop a sustainable business model. This adoption does not only apply to startup ventures but is increasingly being taught and implemented in established organizations as well (Teece, Peteraf & Leih, 2016; Blank, 2013).

The widespread adoption of LSA and iterative perspective on the business model mirrors the literature on entrepreneurial choice and strategy (Frederiksen & Brem, 2017), highlighting the fundamental role of given means (Sarasvathy, 2001), uncertainty (Knight, 1921; Teece, Peteraf & Leih, 2016; Chandler et al., 2011) and learning through experimentation (Ganco, Holcomb & McDonald, 2016; Kerr, Nanda & Rhodes-Kropf, 2014). But while core concepts are mirrored in the literature, LSA has also been subject to criticism, specifically that they too often fail to

account for the cost of experimentation (Gans, Wu & Stern, 2019) and lack a strategic framework that provides a direction to what some consider unrestrained experimentation (Collis, 2016; Gans, Scott & Stern, 2018).

2.4 Principles of Entrepreneurial Strategy

In an attempt to align the practice of hypothesis-based entrepreneurship with theory, Gans, Stern, and Wu (2016) propose three principles of entrepreneurship that can be deduced from the conditions of freedom, resource constraints, fundamental uncertainty and learning through experimentation.

1. Choice matter: There is path dependence in entrepreneurial choice. Once a decision to follow a given path has been made, the entrepreneur is eliminating or reducing the chance of following other viable strategies.
2. These choices matter: Major strategic choices (Gans, Stern & Wu (2016) define four; customer, technology, identity, and competition) require at least partial commitment in order to learn through experimentation.
3. These choices matter together: Choices are interdependent and have complementarities (i.e. they emphasize each other's qualities), meaning that it is important to consider not only the individual choice but to take into account how they affect each other.

According to Gans, Stern, and Wu (2016), these principles lead to the central challenge of entrepreneurial strategy; *the paradox of entrepreneurship*: “Choosing between alternative strategic commitments requires knowledge that can only be gained through experimentation and learning of kind that inevitably results in some level of commitment that forecloses particular strategic options.” Gans, Stern & Wu (2016, p. 4).

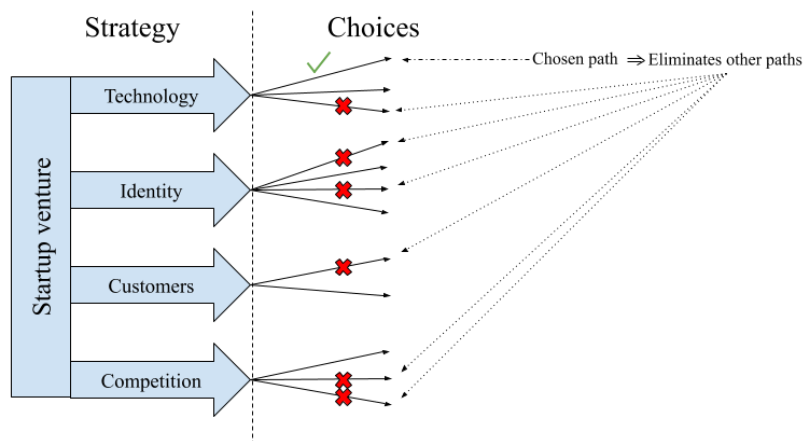


Figure 1: The principles of entrepreneurial strategy (Gans, Wu & Stern, 2016)

This paradox has several implications for strategizing in entrepreneurial firms. First, any given idea will have more than one alternative path through which value can be created and captured, yet resource constraints usually prevent the entrepreneurial firm from conducting multiple parallel experiments (Gans, Stern & Wu, 2016; Ries, 2011). The fundamental uncertainty surrounding these paths implies that even after undertaking a cost-benefit analysis to deselect some alternatives, there will still be unresolved uncertainty preventing a ranking of at least two alternatives (Milliken, 1987). Gans, Stern & Wu (2019) refer to this as noisy learning and is based on commitment-free learning activities.

There is also path dependence in entrepreneurial choice, meaning that partial movement down a path to learn more about a strategic choice changes both the value of and the information available about alternative paths (Collis, 2016; Gans, Stern & Wu, 2016). Entrepreneurial strategy then involves making strategic choices that could involve leaving equally viable paths behind. This has a significant implication for founding teams; there is a tension between experimentation and commitment to a given strategy that must be balanced when making decisions (Gans, Stern, & Wu 2016; Contigiani, 2018). Empirical evidence based on these findings is just beginning to emerge. An analysis of 1200 US-based software ventures found that startup ventures facing strong competition respond more in terms of experimentation, and that experimentation has a large impact on value creation when there is high demand uncertainty (Contigiani, 2018). The same study also revealed that startup ventures tend to experiment more when the learning benefits exceed the risk of imitation from competitors, illustrating the tension between experimentation and commitment (Contigiani, 2018).

2.5 Components of Entrepreneurial Strategy

Strategies, both deliberate and emergent, are a result of a set of decisions being made among many alternative choices (Mintzberg & Waters, 1985). While there are many important choices that an entrepreneurial firm must make, there are certain choices where the balance between experimentation and commitment is particularly salient, as choosing to experiment along one path is likely to exclude alternative paths. In the context of entrepreneurial strategy, a choice is often concerned with the initial determinant choices that shape the firm's strategy (Murray, 1984).

Given that entrepreneurial strategy is concerned with testing a firm's value creation and capture hypotheses, Gans, Stern, and Wu (2016) propose a choice-oriented framework based on four core choices, where value creation is linked to the choice of customer and technology, while value capture is linked with the choice of competition and identity. Together, the sum of these choices defines the entrepreneurial firm's strategy, as illustrated in Figure 2. Gans, Stern, and Wu (2016, p. 19) states that "Failing to make an explicit choice on one of these dimensions of Customer, Technology, Competition, and Identity necessarily means that an entrepreneurial

strategy has not been formulated.” Appendix 1 summarizes the views of Gans, Stern, and Wu (2016) on these core choices. Besides, significant complementarities and interdependencies between these choices exist, implying that the set of these choices may be more important than any individual choice when strategizing (ibid.).

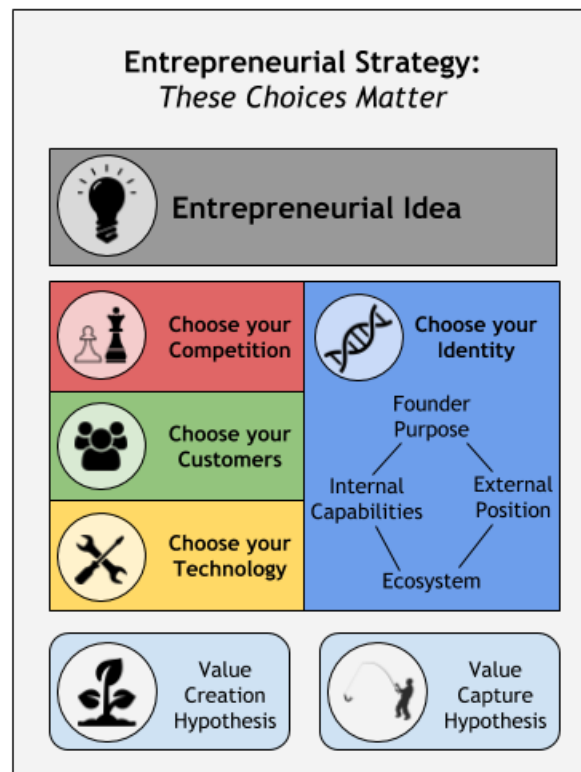


Figure 2: Entrepreneurial strategy is made up of the four core choices. Adapted from Gans, Stern, and Wu (2016)

2.5.1 Entrepreneurial Strategy as a Framework

The work of Gans, Stern, and Wu (2016) is one of the few holistic frameworks within the field of entrepreneurial strategy that attempts to unify research and practice, building on a variety of interrelated research on strategy, entrepreneurial learning, and experimentation presented above. The goal of their work is to define and delineate the scope of entrepreneurial strategy, as well as clarifying the set of choices and complementarities that shape entrepreneurial strategy.

The insights presented in the earlier sections are here summarized in a central organizing framework. With the goal of resolving *the paradox of entrepreneurship*, the framework can be used to delineate entrepreneurial strategy along two dimensions: attitude towards incumbents (collaboration versus competition) and attitude towards innovation (execution versus control). The *dimension of collaboration and competition* concerns the choice of with *whom* to compete, and while founding teams cannot choose to not compete - they need to choose a route to commercialization that involves either direct competition with established players or cooperating with them and integrating into an established value chain (Teece, 1986). The *dimension of*

execution and control concerns the choice of *how* to compete. While *execution* is a means of rapidly developing, commercializing, building capabilities and gaining market shares in order to compete, *control* is about investing in securing formal intellectual property protection and protecting their capabilities, building bargaining power and excluding others from direct competition.

The framework is presented in Figure 3 and yields four distinct entrepreneurial strategic trajectories - each involving a specific set of choices regarding *customers, technology, identity, and competition*, which are specified in Appendix 1. The authors define strategic trajectory as the current value capture and value creation hypothesis of a startup venture; in other words - the path that it's already heading towards, implying some commitment has already been made. While discussing specific strategies is outside the scope of this thesis, this conceptualization builds insights from both practice and literature.

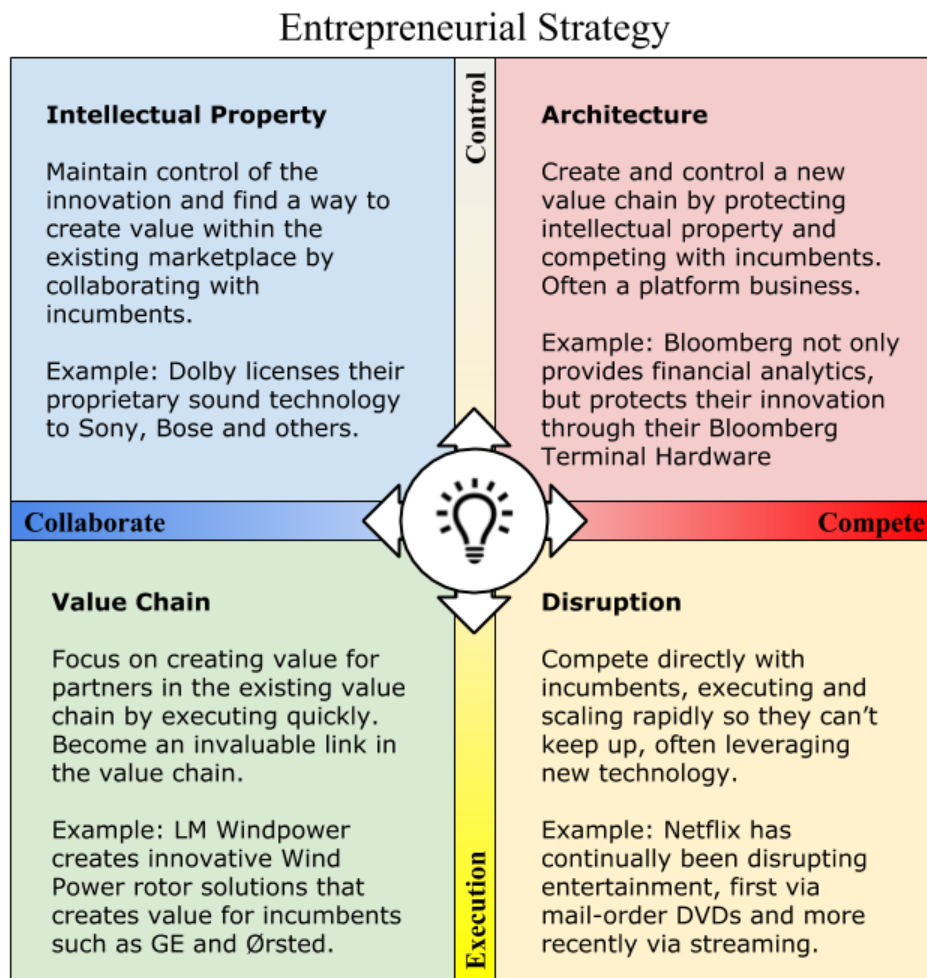


Figure 3: Framework for entrepreneurial strategy presented by Gans, Stern & Wu (2016)

Some empirical evidence is beginning to emerge based on this framework. The work of Ching, Gans & Stern (2018) highlight this tension by examining student-led startup ventures and faculty-led startup ventures, finding that student-led startup ventures display a timing pattern that is consistent with a strategic tradeoff between control and execution, with a clear preference for rapid commercialization.

Gans, Stern & Wu (2016) propose that it can be used by practitioners of entrepreneurship in facing the paradox of entrepreneurship and resolving the tension between learning and commitment through proactive choice. Specifically, Gans, Stern & Wu (2019) build on this framework and suggest that entrepreneurs should adopt a search and stop rule when identifying strategies, called Test Two, Choose One: *“Entrepreneurs continue the search until they reach at least two alternatives that are ex-ante equivalent in expected value before making a choice.”* During this choice process, entrepreneurs use commitment-free information to guide their search process. While the information generated by commitment-free learning is inherently noisy, it can generate a set of alternative strategies that seem viable and eliminate others. Positive information on one alternative not only indicates the potential of that alternative but also increases the value of the underlying idea. This gives rise to an *inducement effect* - positive feedback motivates additional search, rather than immediate commitment. This process continues until the entrepreneur has reached the limit of learning in the absence of commitment and must choose to pursue one alternative, potentially leaving ex-ante equivalent alternatives behind.

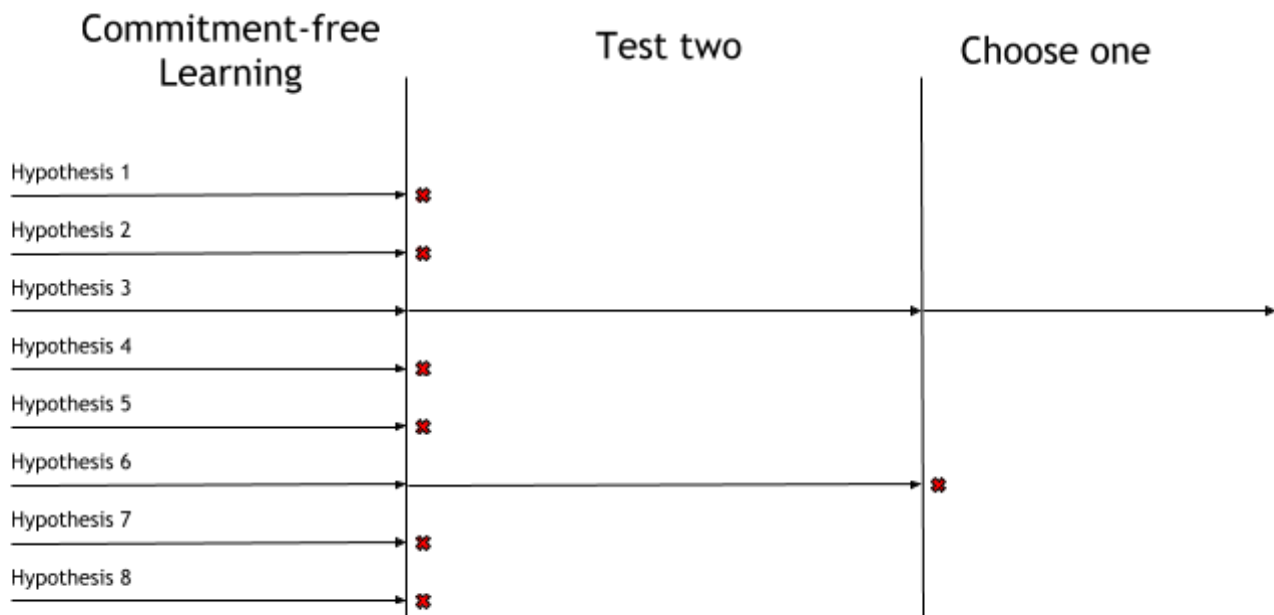


Figure 4: Test two, choose one

2.5.2 Tensions Inherent to Entrepreneurial Strategy

This framework for entrepreneurial strategy highlights some key insights that lay the foundation for further study on the topic. It reveals several tensions inherent to entrepreneurial strategy with relevancy for both the researcher and practitioner of entrepreneurship. For one, it reveals *the tension between freedom of choice and resource constraints*, which reduces the startup ventures ability to pursue multiple strategic alternatives at once (Gans, Stern & Wu, 2019). One central implication of this tension is that entrepreneurs need to learn more about their strategic alternatives in order to make a good choice. At the same time, there is an interplay between uncertainty and noisy learning which reduces the amount of learning possible through commitment-free means (ibid.). This leads the way to *the tension between experimentation and commitment*. In order to gauge whether or not to proceed with an alternative, entrepreneurs can engage in experimentation, but the very process of experimentation can lead to commitments that prevent the entrepreneur from pursuing other strategic alternatives (Gans, Stern & Wu, 2019). Simultaneously there is also a tension between learning and appropriability, where market experimentation can generate valuable information about market preferences, but also increases the risk of imitation.

2.5.3 Strategy as a process

Drawing on these insights, entrepreneurial strategy is descriptive in nature. Gans, Stern, and Wu (2016) describe entrepreneurial strategy as “a set and sequence of choices that a startup venture makes in order to test a value creation and value capture hypothesis,” implying that it is a phenomenon that unfolds over time. This perspective of entrepreneurial strategy can then be described as a process - the sequence of discrete events that comprise the history of each entrepreneurial effort treated as a holistic unit. In other words, partitioning of the observation space is done horizontally, separating each entrepreneurial effort and treating it as a different observation in its own right. This perspective is not exclusive to entrepreneurial strategy, but also encompasses other descriptive views of strategy, such as Mintzberg’s concept of “emergent strategy.”

The theory and method for studying strategic processes in this manner is process theory. As a concept, process theory is concerned with building a narrative that unfolds over time, encompassing all the events of an entrepreneurial journey, their chronology and how they are connected (McMullen & Dimov, 2013). In this context, a process is then defined as “a narrative describing how things develop and change” (Van de Ven, 1992). A process approach to studying strategy in entrepreneurial firms can be useful in identifying patterns and events that can further the understanding of how strategy emerges and develops over time. This approach is in contrast to variance explanation, which tends to partition the observation space into variables, analyzing the separate attributes across multiple observations. Variance approach has been the dominant

approach for entrepreneurship research (Gupta, Chiles & McMullen, 2016) and while useful, has significant deficiencies when attempting to explain processes such as strategic change. Variance explanation assumes that the variable by itself is sufficient for explaining a part of the variance in outcomes. It also establishes a causal relationship but does not provide a causal explanation describing the mechanism through which the relationship affects the outcome (Van de Ven, 2007). Process theory attempts to address these challenges by reorienting empirical studies from focusing on variables across journeys to focusing on events within journeys. Thus, the unit of explanation should be done by journey rather than by its separate variables, implying that the unit of explanation should be the entire process, with all its twists and turns. (McMullen & Dimov, 2013).

Gersick (1994) is an example of an event-driven study designed to understand the developmental process among change events. She developed a grounded theory of how a startup venture regulates its development strategy over time. Gersick analyzed key decisions, events, and strategies in a startup based on monthly interviews with leaders and venture capitalists and board meeting observations. Aldrich (2001) argues that more event-driven process research such as the Gersick (1994) study is needed to develop explanations of entrepreneurial dynamics, citing the limitations of outcome-driven explanations. In addition, she argues there is a selection bias that tends to occur in organizational management theory as a result of the homogenous pool of research candidates. Publicly traded, large organizations are often the only ones that disclose data that is needed to conduct variance research. The field then tends to miss the true diversity and heterogeneity in the organizational landscape. The same is true for entrepreneurship research, especially survivorship bias (Aldrich, 2001). Aldrich calls for a more evolutionary perspective towards theory-building and research, that needs to encompass both outcomes, processes, and contexts, allowing researchers to study how entrepreneurial firms vary, how they adapt in changing environments and which organizational arrangements lead to success and survival (Low & MacMillan, 1988; Aldrich, 2001).

Research questions that seek to explain how the entrepreneurship process unfolds over time should be studied using narrative process methods. Van de Ven and Engleman (2004) concur that process theory can and should be applied to “how” questions, which are concerned with describing and explaining the temporal sequences of events that unfold in the development of startup ventures (Low & MacMillan, 1988). Process studies are also essential for gaining an appreciation of dynamic organization life and developing and testing theories of entrepreneurship dynamics (Aldrich, 2001; Low & MacMillan, 1988), both of which are true for this study.

2.6 Conceptual Framework

The framework presented below is derived from the framework of Gans, Stern, and Wu (2016). The core choices of customers, technology, competition, and identity define the entrepreneurial strategy of startup ventures (See Appendix 1 for an in-depth explanation of these terms). In this thesis, The authors will examine these choices along the dimensions of Experimentation and Commitment. To address the purpose of this thesis, the framework will be applied to each firm's choices and activities and will be used to analyze the impact of experimentation and commitment on strategy and the processes that shape strategy in entrepreneurial firms. This conceptual framework will serve as the foundation of the methodological research design that will be applied for further research in this master thesis. The strategic process in the center of this framework will be interpreted using process theory, which will be further elaborated in the next chapter.

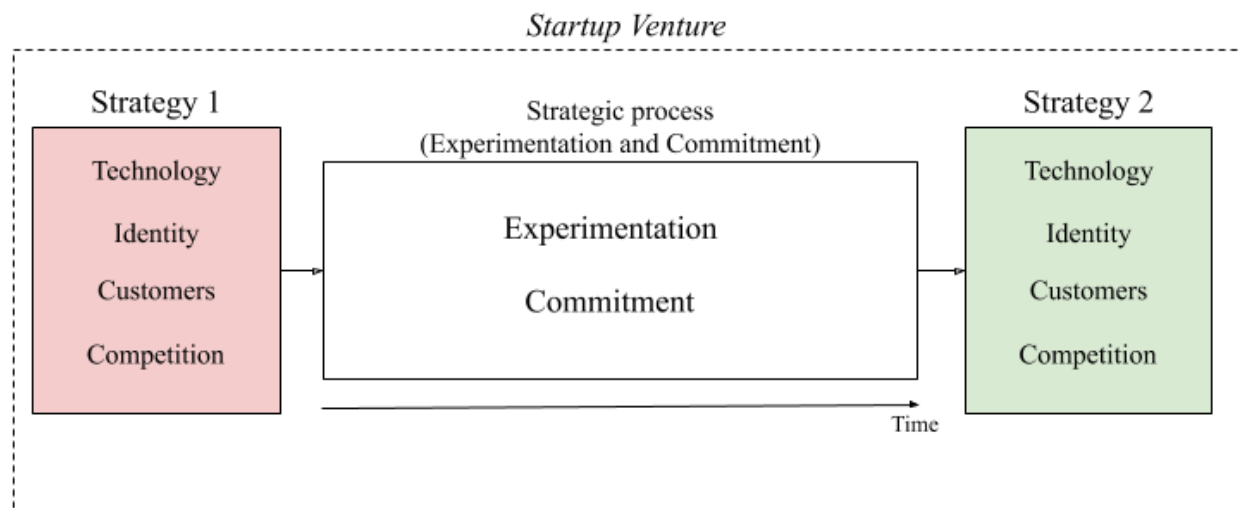


Figure 5: The framework for a strategic process as derived from Gans, Wu, and Stern's (2016)

3. Method

In this section, the authors will elaborate on the research methodology used to accomplish the purpose of this master thesis. The authors will present the research design, including methods used for data acquisition and data analysis. At the end of the section, the limitations of the chosen method are discussed. As it was outlined in the introduction, the purpose of this thesis has been to *investigate the role of experimentation and commitment in strategic processes for startup ventures*. For guiding the authors to achieve this purpose, the following RQs have been designed:

RQ 1 - How do entrepreneurs engage in experimentation during strategic processes, and how does this experimentation affect the strategy process?

RQ 2 - How does the cost of experimentation and commitments affect strategic processes in startup ventures?

To answer these research questions, the authors have conducted an exploratory multiple-case study using a process approach. The strategic process of initial strategy formation and strategic change will be investigated and the authors will, according to the process approach, categorize all significant events for all the cases through these processes. In order to investigate this, the authors have examined five startup ventures who has conducted a pivot i.e startups that have both been through the process of initial strategy formation and a strategic change in the form of a pivot. The pivot is, as previously defined, a distinct type of strategic change (Hampel, Tracey & Weber, 2019), that differs in two important aspects. Firstly, it concerns “an organization in its early years of existence” (Zimmerman & Zeitz, 2002, p. 414). Secondly, these startup ventures are resource-constrained, and its very survival often hinges on executing the pivot successfully once the decision to pivot has been made (Drori et al., 2009).

The framework of analysis was developed from a combination of process study and entrepreneurial strategy. The process approach will guide the authors in how events of each startup venture will be categorized and form the narrative of each startup venture’s journey through the process of strategic change, while Entrepreneurial Strategy will be the fundamental theory from which the authors will be able to evaluate a change in the startup venture’s strategy.

The authors apply a process approach in order to “see” the story of the strategic change through events, where the dependencies and temporal relations of the events are examined. The framework for Entrepreneurial Strategy enables the authors to evaluate the impact of events by putting changes in strategy across the cases into a common framework.

As emphasized above, the authors will examine the process using process theory, where the whole process consists of events, activities, and choices that are somehow interconnected, and together lead to the strategic change. Figure 6 shows how the authors will examine the process of

strategic change using process theory. The initial and current strategy will be the input and output of the strategic change process. The process will be analyzed by defining events that were relevant for the strategic change and find the dependencies between them.

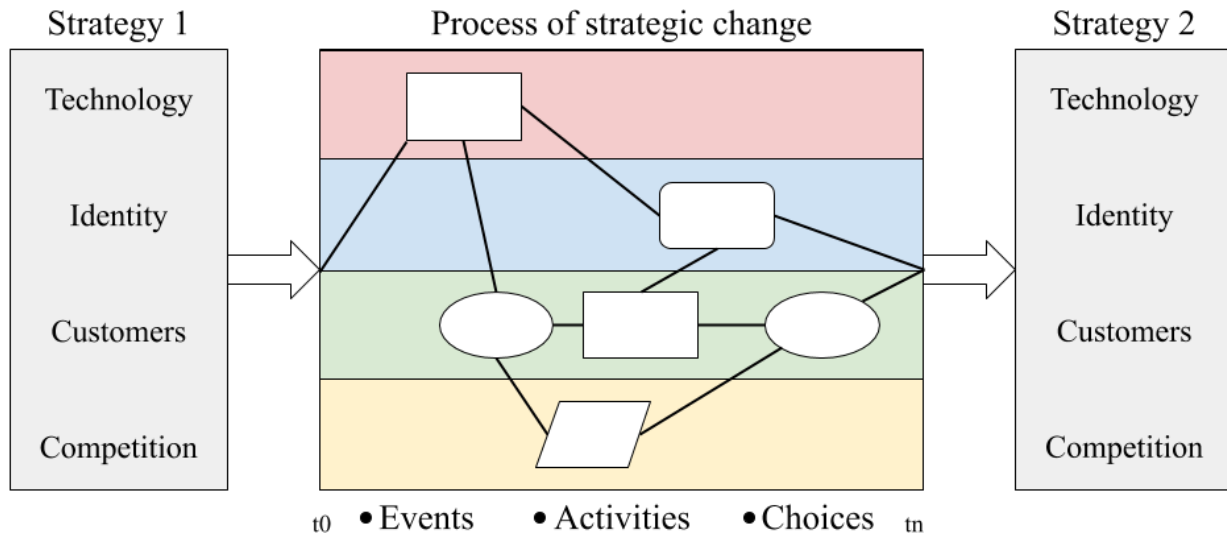


Figure 6: The proposed framework for analyzing strategic processes

3.1 Research Design

Selection of research design is typically based on the nature of the research problem or the issue being addressed (Creswell, 2014). The authors have conducted an exploratory multiple-case study using a process approach to investigate the process of strategic change. Case studies are useful for answering “how” or “why” questions about events that are outside of the investigator’s control (Yin, 2003; Rowley, 2002), which coincides with the phenomena studied in this thesis.

3.1.1 Qualitative study

The phenomenon that have been interpreted in this thesis are the strategic processes of initial strategy formation and strategic change, investigated through the lens of the chosen theory, which has been elaborated in Chapter 2. A qualitative research approach is suitable because it allows for interpreting experiences that are difficult to measure (Dalland, 2012) and because it is the preferred approach for studies with an exploratory nature (Yin, 2003). Process phenomena, such as strategic change, have a fluid character which varies in both space and time (Pettigrew, 1992). One of the major reasons for conducting a qualitative process approach is precisely to take the context into account (Pettigrew, 1992). This approach gives the authors the freedom they needed to go in depth in the different cases and to reveal how the strategic trajectory of the subjects was and changed throughout the process.

3.1.2 Multiple-case Study

The authors chose to conduct a multiple-case study to get a rich description of the process of strategic change. The study will be conducted using a process approach, meaning the authors will allocate, categorize, and put events in order to create a narrative of the startup venture's journey. The narrative will be presented through a visual map. Since the boundaries between the event and the context are not known, and the events investigated happens in a real-life context, a case study is suitable (Yin, 2003; Rowley, 2002). The case study involved five startup ventures used as case companies. Common for all the five startup ventures is that they have gone through a significant process of strategic change by conducting a pivot.

3.1.2.1 Case Selection

The selection of cases is essential because the set of entities from which the research samples are drawn are defined by the population (Eisenhardt, 1989). The cases chosen in this thesis had already conducted a pivot in addition to the initial strategy formation. By looking at startup ventures that have previously conducted a pivot, the subjects provided reflections and thoughts regarding the process of strategic change, background and meaning of the pivot and the change in strategic trajectory, as well as reflections of the outcome. In addition, a pivot is an enormous strategic change. Choosing cases that have conducted a pivot, therefore, increases the chances of identifying significant findings regarding the process of strategic change compared to a startup who only have don minor adjustments to their initial strategy. As argued by Pettigrew (1990), given the restrained number of cases that can usually be studied, it makes sense to choose cases which has conducted "extreme versions" of the process under investigation, which in this study the process of strategic change, so that it is "transparently observable."

The cases have been purposefully chosen by the authors, based on the pivots the companies have made, and how relevant they seem for the study. The cases have been handpicked due to their similarities and differences. The similarities are that they all represent relatively new startup ventures with few initial resources and high initial uncertainty, and they have all been conducting technology development. The differences among the startup ventures are that they have a different degree of innovation, they operate within different industries, the and also both software and hardware ventures have been picked, to investigate the potential difference in costs related to experimentation and commitment. The software startup ventures are InfluMarket, Speaktacular, and Workforce, and the Hardware startup ventures are Funmotor and HealthPedal. An overview of the case companies can be seen in Table 1 below. Note that all companies and people within the cases have been given false names in order to maintain anonymity.

	HealtPedal	Funmotor	Influmarket	Speaktacular	Workforce
Product	Hardware product	Hardware product	Software Platform	Software Product	Software Platform
Industry	Fitness equipment	Electrical motors/generators	Influencer Marketing	Education / gaming	Recruiting
Type of pivot	Product and business model	Customer segment and technology	Product and business model	Product and customer segment	Product and business model
Degree of product innovation	High	High	Low	High	Low
Primary source of data	Interviews	Interviews	Interviews	Interviews	Interviews
Secondary source of data	Funding applications	Funding applications	Newsletters and media coverage	Media coverage	Funding applications

Table 1: Overview of the startup ventures used as case companies in this study.

The different nuances in the process of strategic change for each startup venture were investigated, and to achieve literal replication, some variables need to be fixed. Therefore, four criteria for the cases were outlined:

- 1) The case company must have conducted a pivot.
- 2) The case company must have been established for at least one year at the point of the study.
- 3) The case company must produce products/services (not consulting).
- 4) The case company must have more than one team member.

3.1.3 The process approach

The process approach conceptualizes development and change processes as sequences of events which have unity and coherence over time. The purpose of the approach is to explain outcomes as the result of the order in which the events unfold and of particular conjunctions of events and contextual conditions (Poole et al., 2000). The process approach is often contrasted with Variance theory.

Variance theory tries to explain the continuous change in strategy as driven by deterministic causation, with independent variables acting upon and causing changes in the dependent variables (Van de Ven, 2007; Schoonhoven, Eisenhardt & Lyman, 1990). Using a process study, on the other hand, key decisions, events, and strategies over time are examined (Gersick, 1994) and thereby giving more context to the chain of events. In Table 2, essential differences between a variance approach and a process approach are shown, and a graphical representation of the

differences between approaches can be seen in Figure 7. The authors will now emphasize why a process approach is suitable compared to a variance approach.

In variance theory, the entities maintain a unitary identity over time (Van de Ven, 2007). In process theory, on the other hand, the entity is an evolving central subject that makes events happen, and to which events occur (Abbott, 1988). Therefore, the process approach is suitable when it comes to the unit of analysis since startup ventures evolve over time. The processes undertaken by a startup venture cannot be represented adequately by a set of variables since it has to do with qualitative changes in the entity. Variance theory assumes causes to operate in the same way across cases (Abbott, 1990), and also sees the temporal order in which variables come to play as irrelevant. In process theory, the temporal sequence of events is of grave importance, where a reorder in sequence can cause considerable differences in outcome. This approach is more applicable to the strategic processes of startup ventures since the temporal order of events can make an enormous impact. Variance theory states that the immediate past is perpetually producing the future (Abbott, 1990). This statement would be true if all the context surrounding the events were encapsulated in a finite set of dependent and independent variables. Unfortunately, this is not the case, and therefore a process approach, where the temporal sequence and context of previous events are taken into account is more suitable in this case study. Last, but not least, variance theory operate continuously and uniformly over time. This means that they treat each variable as though it has the same status and/or meaning throughout the process (Van de Ven, 2007). This is not the case for startup ventures, where the timing of e.g. funding denied can make vast differences. Therefore a process approach is suitable, where the affected entity can change, and the same event can have a completely different impact on a different point in time.

Variance approach	Process approach
Fixed entities with varying attributes	Entities participate in events and may change over time
Explanations based on efficient causality	Explanations based on final, formal, and efficient causality
Generality depends on uniformity across contexts	Generality depends on versatility across cases
Time ordering among independent variables is immaterial	Time ordering of independent events is critical
Emphasis on immediate causation	Explanations are layered and incorporate both immediate and distal causation
Attributes have a single meaning over time	Entities, attributes, events may change in meaning over time

Table 2: Differences between variance and process approach. Adapted from Poole et al. (2000, p. 36).

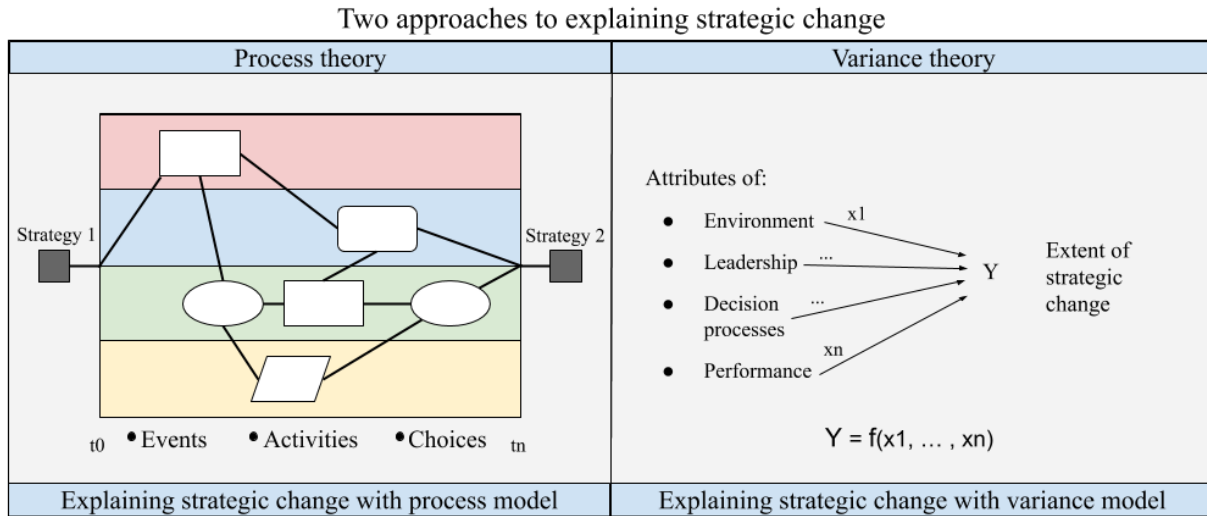


Figure 7: The difference between process theory and variance theory. Adapted from Mohr (1982).

The authors have chosen to use the process approach because of its focus on the whole story. This focus is needed in order to try to capture the process from the event that triggers the realization that a change of strategy is needed for the implementation of the new strategy.

In this study, the authors will create a narrative through a visual map for each startup venture based on events found through the interviews and secondary sources. The authors will use these narratives and their events to shed light over the purpose and research questions of this study.

3.2 Data Acquisition

The primary source of data was semi-structured interviews with two entrepreneurs within the chosen ventures. These interviews were combined with secondary sources such as funding applications (Funmotor, HealthPedal, Workforce), newsletters (InfluMarket), and media coverage (InfluMarket, Speaktacular) about the process of strategic change for triangulation. The chosen secondary data vary, based on what could be found about the respective case-company. According to Rowley (2002), one of the greatest strengths of case studies, compared with other methods, is that evidence can be collected from multiple sources, and then be triangulated. Data triangulation uses evidence from different sources to confirm the same finding.

It was decided that two of the authors had to be present during the interviews to complement each other. Multiple investigators have two key advantages (Eisenhardt, 1989). First, they enhance the creative potential of the study. Team members often have complementary insights which add to the richness of the data, and their different perspectives increase the likelihood of capitalizing on any novel insights which may be in the data. Second, the convergence of observations from multiple investigators enhances confidence in the findings. The interviewer has the perspective of personal interaction with the informant, while the notetaker retains a

different, more distant view (ibid.). An interview guide was also made and iterated on, and test interviews were conducted before engaging the interviews with the entrepreneurs from the case companies.

The timelines created by the interview objects during the interview was a key contributor to creating narratives for the startup venture's journey through the process of strategic change. The authors have combined the timelines from both entrepreneurs interviewed in each case and supplemented these with events found in the transcripts from the interview object creating a new timeline for each startup venture. All transcripts and the new timelines have been sent to the interview objects for revision and acceptance. By sending these to the interview objects along with the transcripts, the authors was able to validate the events and the order of these, and thus validating the narrative created for each startup venture. This was important in order to develop the visual maps as accurate as possible.

3.2.1 Interview

The authors have conducted in-depth interviews with entrepreneurs from the five selected case-companies. By interviewing the entrepreneurs about their pivot, the circumstances that led to a decision of strategic change, and the impact it had on their strategy, the authors provide contextual and empirical evidence, which gives insight to 1) the process of strategic change in startup ventures, and 2) clarify the role of experimentation and commitment in forming a startup venture's strategy.

The primary source of data was semi-structured interviews with two entrepreneurs within each case-company. The objective of the interviews was to investigate the pivot, how the startup ventures engaged in experimentation, how they committed and how the startup venture's strategy changed as a result of it, in order to illuminate the process of strategic change. The authors conducted one interview separately with each of the two entrepreneurs from each of the five startups ventures, providing the authors with a total of ten interviews that lasted 75 minutes on average. The interview objects were interviewed about their strategy before the pivot, the processes they went through during the pivot, and the strategy of the startup venture after the pivot. The interviews were recorded and later transcribed. The transcriptions are in total 195 pages and constitute the primary data for this study.

The semi-structured format of the interviews gave the interviewees room to reflect on why they took the actions they did, and what the consequences of them were. It also gave the authors flexibility to steer the interview, to make sure all the topics were covered. According to Rowley (2002), the researcher is an active agent in the process of the interview. It means that the role of the researchers is to ask open questions and listen to and interpret the answers from the interview objects. It involves having a sound grasp of the questions and propositions of the case study and being able to approach the study in an unbiased and flexible manner.

The interviews followed the interview guide, which was based on the following four focus areas:

- 1) Open questions.
- 2) Centered around the interviewee's view and description of the pivot.
- 3) Cover a broad range of the issue.
- 4) Ask specific questions in addition to the open and general ones, to gain more thorough descriptions from the interviewee on specific topics.

To ensure that the questions were of high quality, the authors first conducted three iterations on the questions with guidance from their supervisor, before conducting the first test interview. Based on the first test interview, the questions were again iterated on, and a second test interview was conducted. After the second test interview, the last iteration, with minor adjustments, was conducted. In total, five iterations were made to the questions each providing incremental improvement securing the quality of the final version.

When selecting objects for interviews, Dalland (2012) recommends choosing persons of interest with specific knowledge or experiences. As the purpose of this thesis has been to investigate the role of experimentation and commitment in processes of strategic change for startup ventures; It was essential that the participants were entrepreneurs that participated in the process of strategic change i.e. the pivot. They must also have partaken in the decision-making process, have a clear overview of what has been done, and why it was done. For this reason, the interview objects had to fulfill the following selection criteria:

- 1) Active in the strategic decisions in the case-company during the pivot,
- 2) Involved in the case-company through the whole process,
- 3) Overview of what has been done and the case company's future plans.

3.3 Data Analysis

The next step in the research process was to transform the information collected from the interviews and secondary sources into useful data, which according to Dalland (2012) can be as challenging as conducting the interviews themselves. According to Rowley (2002), a good case study analysis must comply with the following four principles: 1) The analysis must make use of all the relevant evidence. 2) The analysis must consider all the major rival interpretations and explore each of them in turn. 3) The analysis must address the most significant aspect of the case study. 4) The analysis must draw on the prior expert knowledge in the area of the case study, in an unbiased and objective manner.

It is important to note that in this study, the entity of the narratives will be the startup ventures as a whole and not the individual entrepreneurs that constitute the startup venture. This means that the authors will evaluate an event occurring to one of the entrepreneurs as if it is occurring to the startup venture itself. This simplification is made since the startup ventures used as cases in this study are small and heavily influenced by the entrepreneurs that have been interviewed, meaning the boundaries between individual and collective processes and events are small and unclear. The authors chose to view the startup venture as the central subject/entity, for three reasons. First, the interviews conducted have been about the startup venture and not about the individual entrepreneur. Second, given that all members of the startup ventures are not interviewed, it would not make sense to categorize entrepreneurs who were not interviewed as entities, but it would not make sense to only regard the interviewed entrepreneurs as entities either. The third reason is that by viewing the startup venture as a whole as the entity, it is possible to combine the framework of process study with the theory about entrepreneurial strategy which is focused on the startup venture on a system level and not on the individual entrepreneurs.

For conducting this process study, the authors have chosen to make use of visual mapping strategy. This is a suitable strategy for sensemaking when multiple cases (5 or more) with a moderate level of detail are investigated (Langley, 1999). Visual graphical representations are especially appealing for the analysis of process data because they allow the simultaneous representation of a great number of dimensions, and they can easily be used to show precedence, parallel processes and the passage of time (Langley, 1999). Through identifying, categorizing, and analyzing events, the authors have created a visual map for each case representing the process of strategic change. The process of creating visual maps are outlined in Figure 8.

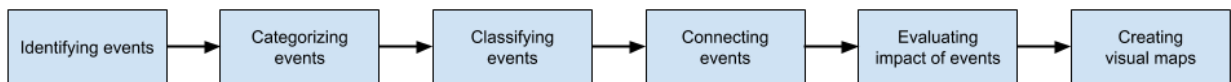


Figure 8: The process of creating visual maps

3.3.1 Identifying events

The most important thing at the beginning of the coding, was, identifying events from the data, which means to go from a citation to an event. It was also essential to place the events in the correct temporal order. In Table 2, an example of the initial coding of events can be seen.

Time	Citation	Event	Source
March 2016	“I got the idea in March 2016”	Entrepreneur 1 got the idea	Entrepreneur 1

Table 3: Initial coding of events

The authors used a spreadsheet for each case, meaning that events from both interviews and secondary sources are coded into the same sheet. After making sure all relevant events for each case were placed at the correct place in time, the next step was to categorize these events.

Note that even though the time of the events is a part of the coding, it is only used for getting the events in the right order, since the time itself is of no interest in this thesis because it does not influence the categorization of events. The same goes for the length of particular events. Despite the apparent temporal precision indicated by the word “event,” there are also obviously different levels of events: an event may include a bad year, a merger, a decision or a handshake (Langley, 1999). In this study, the temporality of events is of crucial importance, but only in the sense of creating a correct temporal sequence of the events.

3.3.2 Categorizing events

In order to see similarities in events and the patterns of events between the cases, the authors decided that the categories should be common among the cases. Generalization is possible only if similar types of events can be identified across sequences. Therefore it is essential to develop categories that put events into meaningful types consistently and validly (Poole et al., 2000).

In order to create meaning out of the categories, the authors decided the categories should be further placed within four different themes. The themes are *Experimentation*, *Commitment*, *Feedback*, and *Other*. The themes of Experimentation and Commitment were part of the chosen framework and essential for answering the stated research questions. Feedback was natural to include as a theme after the early discovery that much of the experimentation done by startup ventures was conducted in order to get feedback, both external, internal, and from the market. As previously stated, entrepreneurs often conduct experiments in order to understand where to commit, and in order to know where to commit, they are dependent on feedback. The last theme, Other, is included because there evidently will be events that fall outside the chosen themes. The authors want to examine the link between events related to Experimentation, Commitment, and Feedback, but naturally, there are events in a startup ventures history that cannot be categorized within these themes.

The next step was finding categories. This step was done in an iterative process since the categories were to suit all events in all the five cases. It is important to note that the four themes mentioned above have not been affecting the categories. The authors have instead chosen to create the categories directly from the events. The reason for this is that the events are what they are, and by creating the categories from the themes there would have been a high risk of forcing an event into a sub-optimal category-fit and thereby losing valuable information. When the events themselves are the base for the categories created, the essence of the events will be preserved when abstracted into categories. After categorizing all the events, clusters of categories

were identified in order to get a higher level of abstraction and then related to one of the four themes. The chosen are shown in Table 4.

Category	Cluster	Theme
Constraints	Expectations & background	Commitment
Experience	Expectations & background	Commitment
Ideation and founding	Expectations & background	Commitment
Motivation	Expectations & background	Commitment
Strategic focus	Expectations & background	Commitment
Education	Expectations & background	Commitment
Intellectual Property Protection	Technological commitments	Commitment
Product iteration	Technological commitments	Commitment
Product launch	Technological commitments	Commitment
User Growth	Technological commitments	Commitment
Change in key personnel	Team commitment	Commitment
Company culture	Team commitment	Commitment
Expanded team	Team commitment	Commitment
Marketing	Stakeholder commitment	Commitment
Partnerships	Stakeholder commitment	Commitment
Business experimentation	Market experimentation	Experimentation
Business model	Market experimentation	Experimentation
Market research	Market experimentation	Experimentation
Problem discovery	Market experimentation	Experimentation
Product development	Product experimentation	Experimentation
Prototyping	Product experimentation	Experimentation
User testing	Product experimentation	Experimentation
Customer contact	Market feedback	Feedback
Customer feedback	Market feedback	Feedback
Customer meeting	Market feedback	Feedback
Relation with competition	Market feedback	Feedback
External Counselling	Professional feedback	Feedback
External feedback	Professional feedback	Feedback
Mentor input	Professional feedback	Feedback
Network	Professional feedback	Feedback
Application	-	Other
Ecosystem	-	Other
Funding denied	-	Other
Internal discussion	-	Other
Received funding	-	Other
Sale	-	Other

Table 4: The categories with their overarching clusters and themes.

3.3.3 Classifying events

In addition to categorizing the events, the authors have also chosen to classify them, whereas the category states the essence of what the events contain. The classification expresses the condition of the event. The authors have chosen the following classifications:

Activity - Events where the startup venture do something

Choice - Events where a significant decision happen.

External event - Events that affect the startup venture, but they have no control over.

Context - All events that brings context to the visual maps but can not be classified as any of the above. Examples are thoughts, ideas, and previous experiences affecting the startup venture

Note: All that could not be classified as Activity, Choice, or External event have been classified as Context.

3.3.4 Connecting events

When conducting a process study, it is essential to understand that each event is simply one piece of the puzzle, that as a whole makes out the process. In order to recreate the process, it is therefore important to connect each event together with other events. The authors have therefore gone through all events in the different cases and connected them to previous events leading to that particular event, and their successor for which this particular event is the trigger. In addition, the authors have, to the best of their abilities, evaluated the strength of connections between the events.

3.3.5 Evaluating the impact of events

The last thing remaining for enabling the creation of the visual map is to evaluate which dimensions of the startup venture's strategy the event has an impact on. This step has been the most challenging part of the coding since it is the part that has demanded the most evaluation from the authors. In this study, the authors have chosen to evaluate the impact of the events on Identity, Technology, Customers and/or Competition retrieved from the framework of Gans, Stern, and Wu (2016). For each event, the authors have evaluated to the best of their abilities whether or not it is affecting one or more of these dimensions. Keep in mind that the authors have not evaluated to which degree an event influence any of these.

3.3.6 Creating the visual maps

Based on the work described in chapter 3.3.1 - 3.3.5, the authors have created a visual map for each startup venture’s journey through the process of strategic change. All the information previously described have been stored in spreadsheets. An exemplification is shown in Table 5.

Event#	Previous Event#	Next Event#	Citation	Event	Category	Classification	Theme	Tech	Id	Cust	Comp	Source
12	11 +++	17 +	“We made prototype”	Made prototype	Prototyping	Activity	Experimentation	X				Entrepreneur 1

Table 5: Final coding of events ready for visual mapping

In this example, event #12, “Made Prototype,” was strongly connected to its previous event, #11, but is just weakly connected to event #17, for which event #12 is previous. This event is naturally categorized as Prototyping, belonging to the theme Experimentation and classified as an activity. In addition, this event affects technology but has no impact on neither Identity, Customers, nor Competition.

Based on these sheets, the authors have created visual maps of the startup ventures’ journey through their pivot i.e. the process of strategic change. An example of the visual maps can be seen in Figure 9 below.

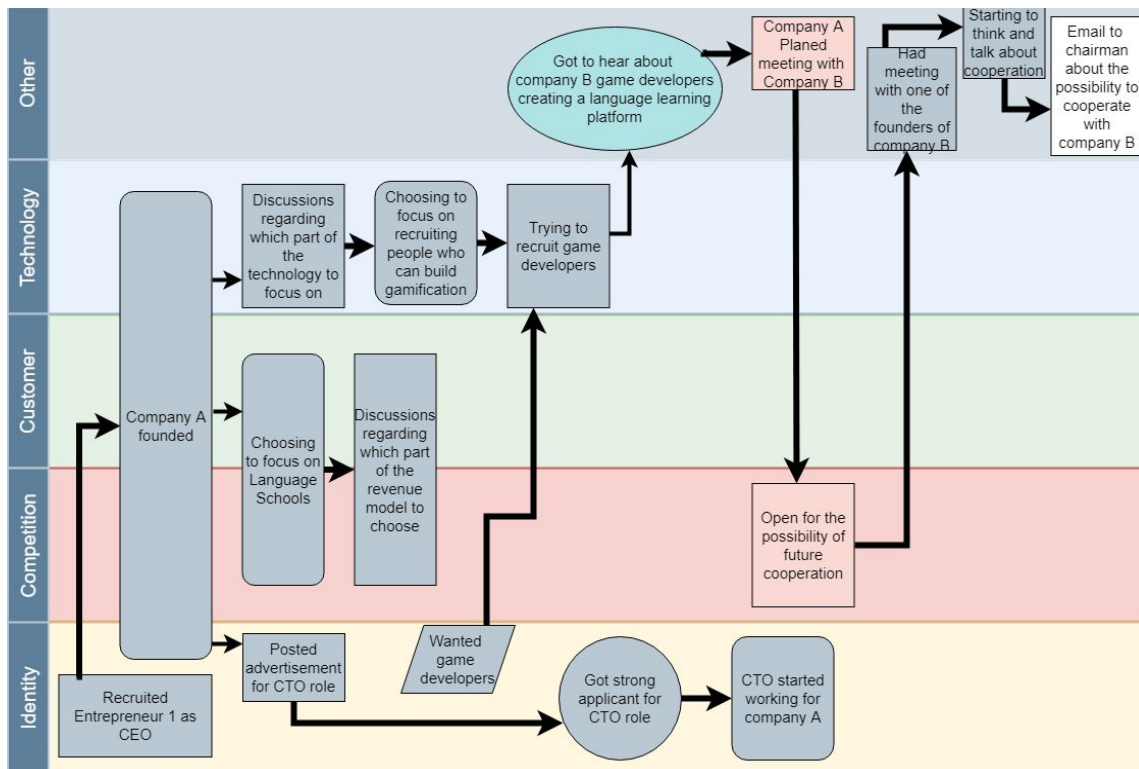
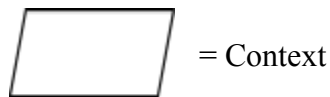
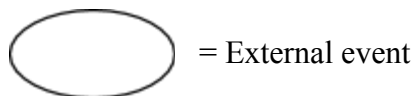
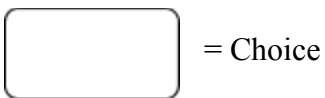
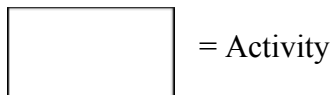


Figure 9: An example of the constructed visual maps

Event boxes

Here, the elements of the visual map will be shortly elaborated. In the visual map, different event boxes are found. These indicate the different classifications of events. The event boxes will be placed in temporal order along the x-axis and in one or more of the dimensions of strategy along the y-axis depending on what type of change (Identity, Technology, Customers and Competition) the event is influencing. The different types of events are:



Colors of the boxes

The different colors of the boxes symbolize the different themes from the coding.

Turquoise boxes = Experimentation

Pink boxes = Feedback

Blue-grey boxes = Commitment

White boxes = Other

Dimensions

There are several dimensions in which the event boxes will be placed depending on which type of change the event is influencing. The dimensions are technology, identity, customers, and competition. In addition to these, there is an open field for all other types of events that are not influencing any of the previous.

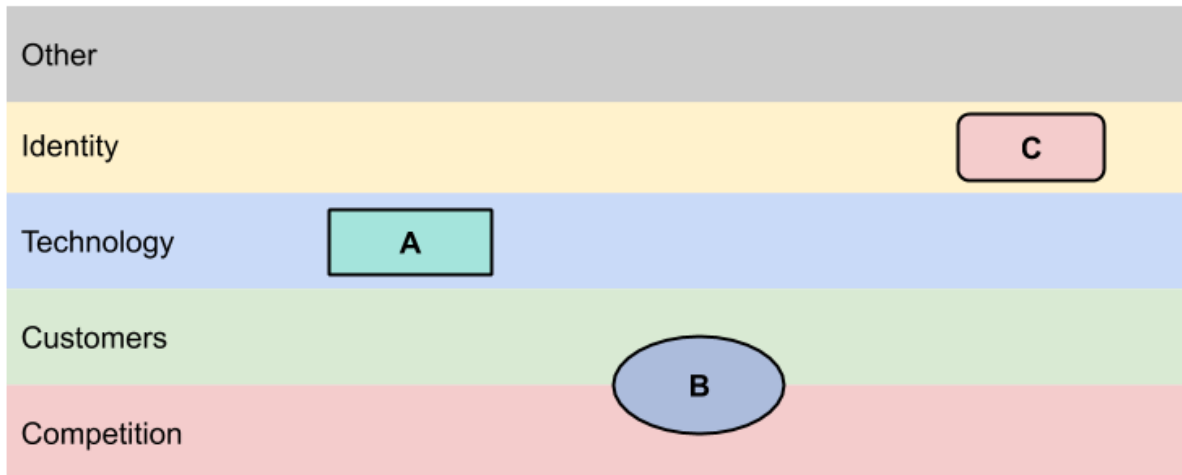
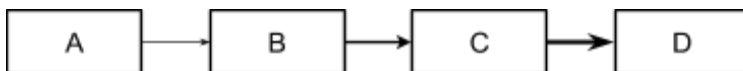


Figure 10: An example of the placement of events sorted in strategy dimensions

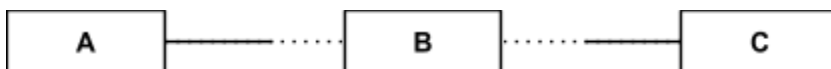
It can be seen that event A is an activity influencing the technology e.g., Prototyping. Event B is an external event that is influencing both customers and competition, e.g, a new actor in the market. Event C is a choice the startup venture makes that influence identity.

Lines between boxes

In the visual map, lines between the boxes are found. These indicate how strongly one event is connected to another. In the visual maps, three different line thicknesses are used to indicate the strength of connections between events.



This figure indicates that A was of little importance for B to happen, B was of medium importance for C to happen, and C was very important for D to happen. In addition to the solid lines, a special case with dotted lines exemplified is below. This example indicates that event A is connected to C, but B is connected to neither A nor C.



3.3.7 In-Case Analysis

In this study, the authors will conduct a cross-case analysis of the five chosen startup ventures. In addition, the authors have also chosen to first conduct an in-case analysis. According to Aabo, Dubois & Lind (2012), keeping a focus on in-case analysis when conducting a multiple case study may have its virtue. The first part of the in-case analysis is the Visual maps created and a description of each case. These descriptions and visual maps are important in order to gain

insight into each and every case (Gersick, 1988; Pettigrew, 1988), and to gain control of all data for analysis (Eisenhardt, 1989). The point of the visual maps and the case descriptions is, as Eisenhardt (1989) would describe it, to become intimately familiar with each case as a stand-alone entity. The process of conducting the in-case analysis enables the authors to identify unique findings in each case before generalizing findings across cases. Besides, the insight that the authors gain into each case will, in turn, accelerate the process of cross-case analysis (Eisenhardt, 1989). The in-case analysis in the next chapter will comprise of three parts for each case:

1. Case descriptions
2. Visual maps
3. Case findings

The case descriptions and visual maps can be found in chapter four along with the findings for each case. The findings are split into four themes in accordance with the themes used in the coding. Therefore, all findings are structured within Experimentation, Feedback, Commitment, or Other Aspects.

Conducting the in-case analysis is especially important when using the process approach. As previously elaborated partitioning of the observation space is done horizontally, separating each entrepreneurial effort and treating it as a different observation in its own right.

3.3.8 Cross-case analysis

In the cross-case analysis, the authors have looked for similarities and differences across cases. The foundation for this analysis has been the themes previously presented as Experimentation, Feedback, and Commitment. These themes have further been divided. Experimentation has been divided into Product experimentation and Market experimentation. Feedback has been divided into Internal feedback, Market feedback, and Professional Feedback. Commitment has been divided into Technological commitments, Team commitments, and Customer Commitments. In addition to finding generalizations across these sub-themes. This is further elaborated in chapter five. The authors have also looked for differences between the hardware-cases and the software-cases, looking for within-group similarities coupled with intergroup differences in accordance with Eisenhard (1989).

3.4 Reflection and Limitations

Due to the difficulties of generalization, the qualitative research method has been widely criticized by scholars (Yin, 2009). Being objective is a great challenge (Kvale & Brinkmann, 2009) and since the authors are know some of the case participants personally through the startup community, there is a chance for the authors or participants being biased, causing challenges in both data acquisition and -analysis, which will be elaborated further in the following sections.

Thorngate's (1976) categories of accuracy, generality, and simplicity could be used to evaluate the strength of the outcome of the sensemaking strategy, such as visual mapping. Close data fitting concerns what Thorngate (1976) termed accuracy, meaning that the accuracy of an explanation is assumed to be directly related to the quality of fit between the predictions derived from it and the actual state of nature about which the predictions are being made. However, accuracy may counteract generality, another wanted quality that reflects the potential range of situations to which the theory may be applicable. Finally, simplicity relates to the number of elements and/or relationships in the theory. It is important to highlight that none of the different sensemaking strategies score high on all three categories (Thorngate, 1976; Langley, 1999). According to Langley (1999), the strategy of visual mapping typically offers moderate accuracy due to some level of data reduction. Unless it is supported by other methods, the conclusion derived from it can have a rather mechanical quality, dealing more with surface structures of activity sequence than with the underlying forces driving them. For this reason, its conceptualizations will tend to be of moderate generality. The approach can produce useful typologies of process components, but attempts to reach beyond this to deeper generalizations are often less parsimonious because of the large number of variations possible and the difficulty of predicting which ones will occur and why. Therefore the sensemaking strategy of visual mapping offers moderate simplicity (Langley, 1999). The authors aim to compensate for the inevitable imperfections of the visual maps by using these in further analysis, to provide context and insight into each case, and conducting a more in-depth analysis of specific events in the in-case analysis and search for further abstraction and generalizability in the cross-case analysis.

When it comes to the value of qualitative research, the sincerity, strength, and transferability of the study is of utmost importance and is often linked to the concepts of reliability, validity, and generalizability (Kvale & Brinkmann, 2009). This is another way of evaluating the strength of the study. These three concepts and their implications for this study will be discussed in the following sections.

3.4.1 Reliability

Reliability is the concept of the results' consistency and sincerity (Kvale & Brinkmann, 2009). This concept states that a reliable study can be repeated, with the same result (Yin, 2009). To make this possible, the authors have written thorough documentation on the procedures and appropriate record keeping, as proposed by Rowley (2002). Because of the authors' relationship with some of the participants through the startup community, there is a possibility that the participants have shared information that would not usually come forward, but also the opposite, that information was held back by the participants because of the connection to the authors.

Secondly, the authors reflected and thought through the interview questions and sent the interview guide to their supervisor for approval. The authors discussed both the background for

asking the question and how it should be formulated. The authors strived to ask open questions putting the object in control of the answers, to minimize the errors and biases of the study (Yin, 2009). Thirdly, the authors conducted test interviews.

The relationship between interviewer and interviewee might also affect how the authors interpreted data. To mitigate this risk, there were always two authors engaged in matching the data from different cases to ensure consistent and repeatable findings. On the other hand, the relationship might have provided valuable knowledge going into the study, putting the authors in a potentially unique position. This can be the preconditions needed for the authors to understand the situation of the interviewee, which conceivably might have improved the quality of the study. This understanding was utilized when preparing the interview guide by creating questions that provided more in-depth insight into the participant's experiences.

Lastly, the authors want to address the ability of the interview objects to recall events. The ten subjects from the five cases are interviewed about processes that were conducted in the past. The details from the subjects regarding choices, thoughts, and reflections are likely to decrease as time goes, meaning that this study, even though all precautions are made, might be harder to replicate as time goes by. The authors hope to mitigate this by making this study available for future research.

3.4.2 Validity

The concept of validity is about the strength and truthfulness in a statement. It is a question about what is being researched, and what is an appropriate research method for it. The theory collected, the content and where it was found should be coherent with the research questions (Kvale & Brinkmann, 2009). Something that might have affected the truthfulness of the study is that the participants potentially bent the truth or have been directly dishonest in order to look better or to satisfy the interviewers or to avoid losing face. The relationship between the authors and the entrepreneurs and their common network is an aspect that might have enhanced this problem. An important choice the authors made in order to mitigate this risk was to anonymize the startup ventures and the entrepreneurs by giving them false names and communicate this to the entrepreneurs before the interviews. Since some time has passed since the entrepreneur conducted the respective pivot, the authors depended solely on the interviewee's memory, which affected the strength and truthfulness of the study. Secondary sources have been used in order to try to compensate for inaccuracies in the interviewee's memory.

The authors also want to address the hindsight bias. Hindsight bias is defined as the tendency for people considering a past event to overestimate their likelihood of having predicted its occurrence (Arkes et al., 1988). This implies that the entrepreneurs being interviewed, who are considering events in retrospect might claim that they would easily have been able to predict those events in advance if they had been asked to do so. In the second turn, the authors believe

that this might also make the entrepreneurs say that they were able to foresee events that they did not actually foresee.

In order to validate the research, the authors have connected relevant theory to the cases. It is essential to find a method that makes the objects talk about their experiences and perceptions in order to understand how a process works (Smircich & Stubbart, 1985), which in this study is the startup venture's pivot. The semi-structured interview allowed dialogue and personal opinions and was therefore suitable for investigating the process. It opened for the participants to elaborate when an interesting matter arose. The context of the cases was different, and this made the semi-structured interview format useful, as the interviewer could steer the interview in the relevant direction. Another way of validating the findings is by having key informants review the drafts. A draft of the transcribed interview was therefore sent to a critical informant for read-through and approval. Finally, pattern matching was used to analyze the different cases to find similarities and differences between the different cases (Yin, 2003).

3.4.3 Generalizability

The concept of generalizability is the ability to extrapolate the results into other relevant contexts and show that the findings are applicable there (Kvale & Brinkmann, 2009). The method of generalization for case studies is an analytical generalization in which a previously developed theory is used as a template with which to compare the empirical results of the case study. If two or more cases are shown to support the same theory, replication can be claimed (Rowley, 2002). The study has worked with five unique cases which all met the given case selection criteria, but despite the similarities, there is no guarantee that the findings can be extrapolated into generalized insight. Nevertheless, the study and its results provide research on the process of strategic change, which is beneficial for future research in the field. The representativeness of a specific group is an essential aspect of generalizability (Lincoln & Guba, 1985). The authors have followed guidelines to ensure that the research is transparent and that the context is accessible for others so they can decide the degree of transferability to their research.

3.4.4 Limitations

The limitations of this study concern elements of the chosen research method, the group of cases studied, and the different elements to look at based on the timeframe. Case studies are one of the most challenging research types as there are no routine procedures for data acquisition. The qualitative approach also comes with several limitations. Firstly, the authors have chosen to narrow down the scope by limiting the strategic processes to the startup venture's as a whole. Hence, not focusing on the process from the perspective of an individual entrepreneur. The interviews are also limited to entrepreneurs within the startup venture, meaning that perspectives of the startup ventures strategic processes from customers, mentors, competitors and other externals are not taken into account. Secondly, the author conducted only one interview with

each of the two entrepreneurs in each startup venture, both within a short period of time, making the information acquired from each startup venture a momentary sample. Lastly, this case study only contain five case companies, and even though providing a lot of valuable insights, we believe that more similar studies should be conducted in order to evaluate the generalizations made in this study.

4. In-Case Analysis

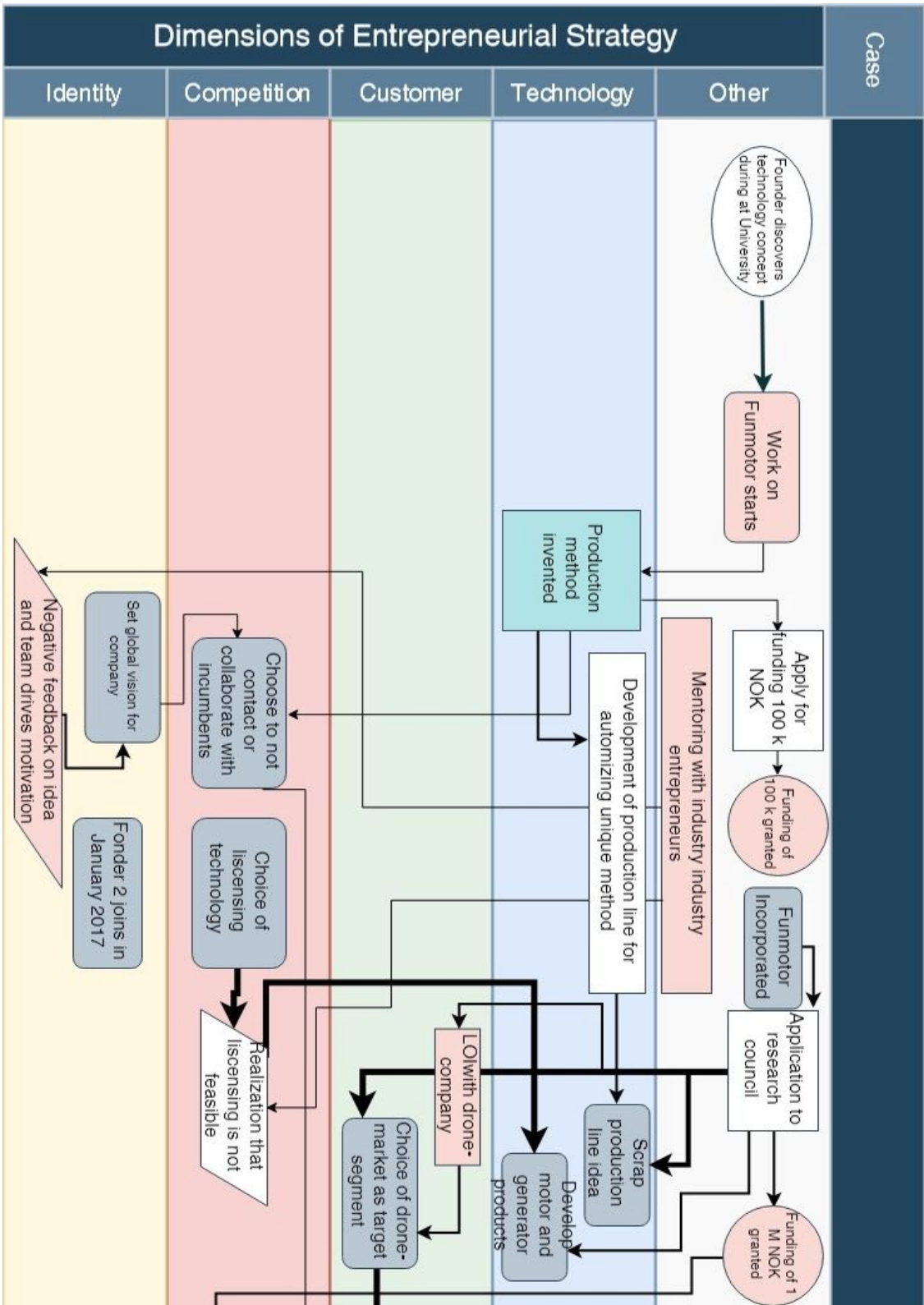
In this section, a summary and analysis of each case will be presented, based on primary and secondary data collected. First, the company history based on the interviews, as well as the decision to pivot and how it was implemented for each case, are summarized. Following each case description is a visual map describing the events, activities, and choices that shaped strategy along the dimensions of customer, technology, identity, and competition. The findings of each case are also presented individually, categorized according to the two themes which have been set out in the framework derived from Gans, Stern and Wu (2016): Experimentation and commitment. In order to structure the findings, a third theme has been added; feedback. Feedback was natural to include once the initial data analysis indicated that feedback was often a separate event from experimentation, affecting the process for each startup in different ways. What came clear to the authors was that startup ventures not only experiment in order to directly understand where and how to commit, but that the startup venture often experiments to get feedback in order to understand where to commit. Feedback is, therefore, essential in order to link together experimentation and commitment, completing the framework presented in Chapter . three. The findings presented in this chapter are significant events that are retrieved from the visual maps. These are events that the author zoom in to due to their evident exemplification of the role of experimentation, feedback, or commitment in startup ventures.

4.1 Funmotor

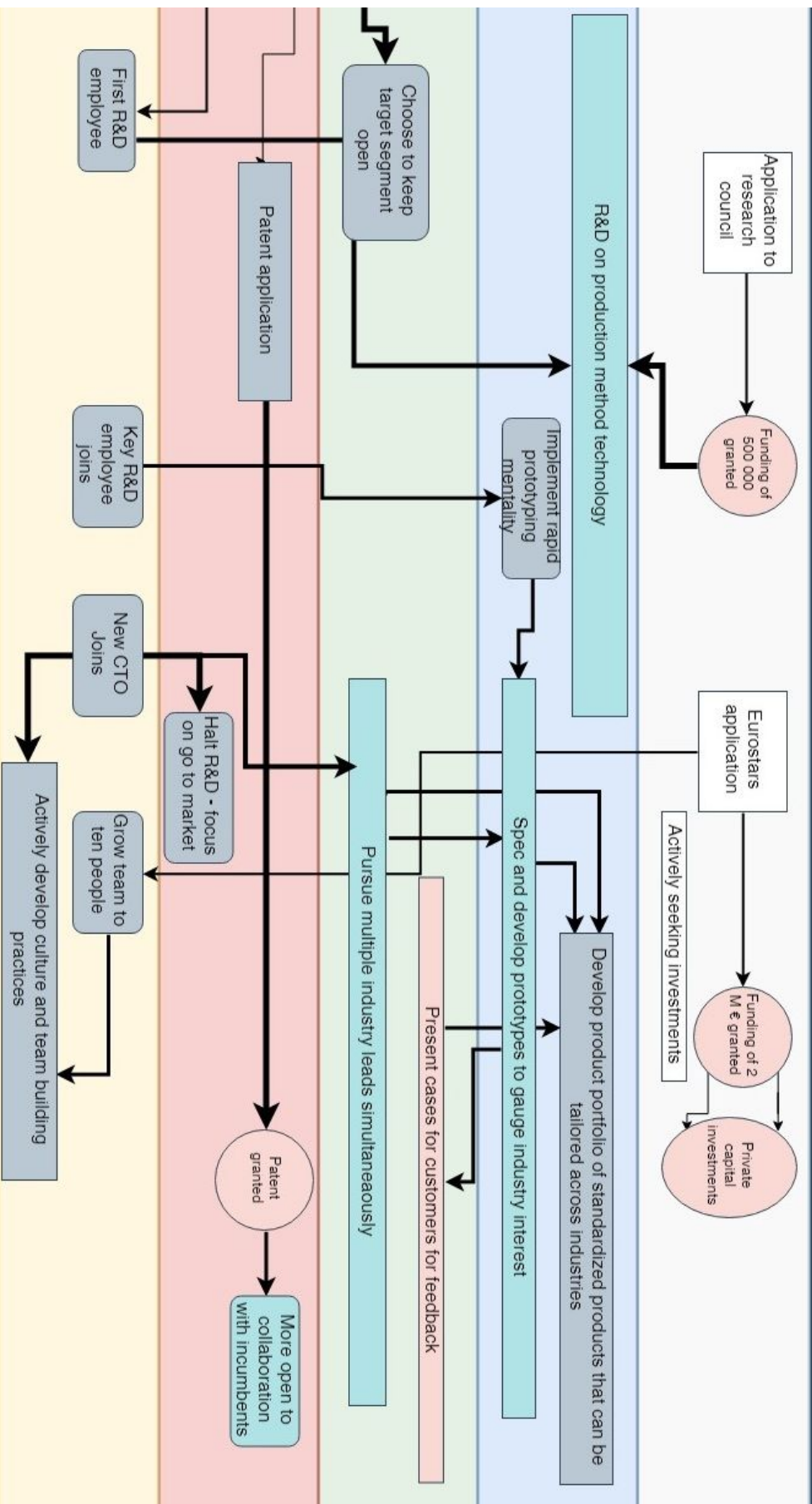
Funmotor designs and develops a new type of electric engines based on a proprietary technology which allows them to produce lightweight, high-performance ironless stators. Jon started working on the idea in January 2016 while finishing his masters degree at a venture-creation program at NTNU. During the following summer, Jon invented the production method for producing the stator component. In January 2017, Kim joined as a co-founder and got responsibility for the funding of the company. Before joining Funmotor, Kim attended a mechanical engineering masters program and had engineering experience from being involved in Formula Student. By January 2017 they had no explicit strategy for commercializing the technology. Over the next two years, two important applications for funding helped shape strategy, both by forcing them to think about essential choices such as customer segment, but also as a result of wanting to appeal to the committee reviewing the applications. The funding from these grants allowed them to grow the team to ten people, mainly working on developing the technology and filing their first patent. During this period, Funmotor had a clear R&D focus and was originally planning on licensing their technology to motor-manufacturers in different industries, while investing in protecting their intellectual property.

Throughout 2017 and the first half of 2018, the team realized that licensing their technology would not be feasible, based on input from potential customers and mentors, as they had no track

record in any industry. This realization made the team look for new strategies for commercialization - designing and producing whole motors and generators while leveraging their unique technology. The following summer, the CTO joined the team who was crucial for implementing and forming a strategy. According to Jon; *“He had a vision and was very aggressive.”* This led to a series of ongoing discussions with Jon and Kim on the commercialization strategy, such as how they should position themselves and which customer segment they should target first. Funmotor decided to actively experiment with multiple customer segments, developing business cases for each segment and comparing them before making a choice of which to pursue further. Internal production capacity and identity-fit are all weighted in these choices. Currently, Funmotor’s new commercialization strategy is to develop a portfolio of customizable generators and motors that they will manufacture and sell directly to their customers across a variety of industries.



Funmotor



4.1.1 Findings Funmotor

The interview objects from Funmotor are Jon and Kim. Jon is the CEO of Funmotor and had the initial idea and invented Funmotors core technology. Kim is the CFO of Funmotor, responsible for the financial aspects and applications for research grants. For the vast majority of the company history, they have been the management team responsible for setting and executing strategy. Funmotor is characterized as a high-tech case where the majority of time and resources has been spent on technology exploration. Strategically, Funmotor has invested in control over its underlying technology and has based its commercialization strategy on competing rather than collaborating.

4.1.1.1 Experimentation

Funmotor is characterized by its investments into R&D and long commercialization time. As such, its product experimentation has been significant throughout its entire history. While Funmotor since its inception has been agnostic towards industry, developing prototypes for specific industry applications have often been a result of applications for funding. Kim explains how their first prototype came to be: *“It was in connection with the application, you have to answer these questions in the application form; that is essentially the same content as a business plan. There was no technical due diligence. We did not know if it was a good technical application, but we thought drones, everybody will get that.”* As a technology exploration case, Funmotor has invested heavily in conducting product experimentation, both by making prototypes for a variety of applications, as well as in the production method itself.

Funmotor has explicitly employed a strategy of market experimentation. In order to validate the management team has reached out to a variety of industries simultaneously in order to spec and develop prototypes. By using computer-aided design (CAD) and conducting initial feasibility studies, some applications were weeded out before a prototype was built. For applications passing this initial exercise, prototypes were built in order to test and verify its potential savings. Based on this, a business case for each application was developed and scored in order to compare different opportunities. As such, market and product experimentation was conducted in parallel, allowing Funmotor to gain a better understanding both of its technology and the needs and wants of a variety of different applications. *“We want as many cases as possible, so we can make a very specific choice of whom we will pursue first. We need to find those willing to pay the premium for our motors, seeing as we can’t scale up yet. We need to keep it semi-manual for the time being.”* Both Kim and Jon bring up financial and resource constraints as a reason for engaging in experimentation activities. They also emphasize the risk of committing too early to a segment which might not be optimal considering their vision for the company.

4.1.1.2 Feedback

Both product and market experimentation have, to an extent, been conducted in order to collect feedback before the completion of the product development process. The objective of this experimentation was to learn more about potential markets, while adaptation costs were still low. By conducting multiple parallel market experiments, Funmotor gathered feedback that shaped their product portfolio that is designed to fit across a variety of industries. Interestingly, Funmotor only engaged in market experimentation only once their patent application was sent in and pending approval, citing the risk of imitation and maturity of their technology.

Other sources of feedback included mentoring and discussions with industry entrepreneurs. Initially, this feedback was mostly negative, criticizing both the team behind Funmotor and the feasibility of the idea. This type of feedback was instrumental in shaping the firm's identity in its early stages. Jon states: *"People didn't believe in it at all, and that goes for both people we knew, but also people from the industry didn't want to believe that it was possible to build a company that was so technically complex by two guys who didn't know the industry at all. So there was an element of prove-them-wrong mentality on our part."*

4.1.1.3 Commitment

Throughout its history, Funmotor has been very aware of potential commitments, often saying no to potential leads and keeping an arm's length from customers while still exploring the potential of its underlying technology. This includes potential industry partnerships with potentially significant upside, Kim explains: *"We were afraid, and are still afraid because we don't have sufficient patent protection, and we have heard a lot of scary things about how Americans do these things."* As a Norwegian company, they felt it was too risky to experiment in environments where they had no Formal Intellectual Property protection or little knowledge about the environment.

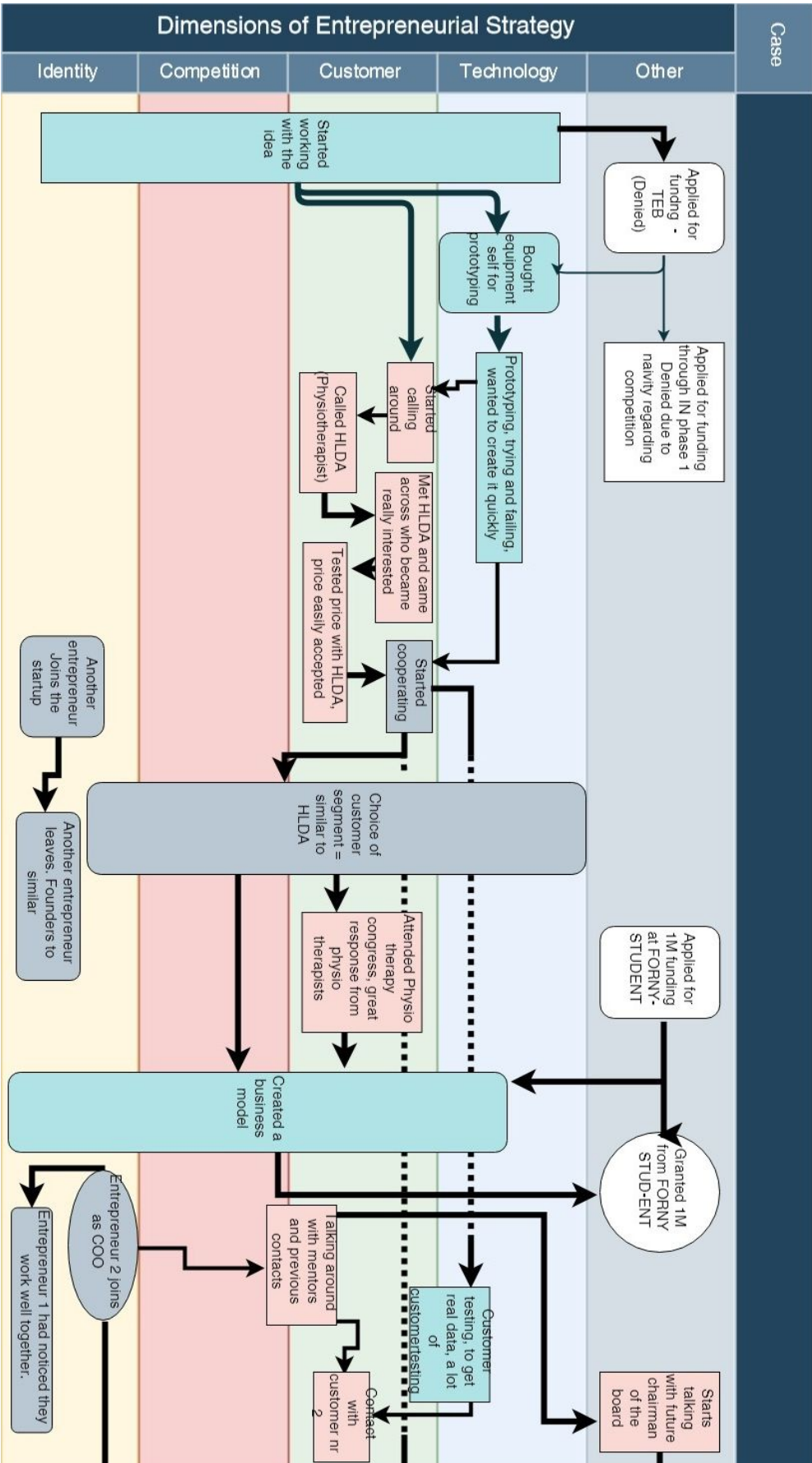
Being primarily funded by national and European research grants, product R&D has been subject to the plans detailed in the often very comprehensive research applications. This has undoubtedly shaped product development to an extent, but Funmotor has explicitly kept industry relationships highly tentative in order to avoid commitment until their technology and business model was more fleshed out. Interestingly, both founders highlight the importance of the lengthy application processes in *"masterminding"* and aligning their goals, activities, and metrics.

Internal commitments such as new hires have also been significant factors in shaping Funmotor's strategy. While there certainly was some aspects of identity present early on in the company history, both founders highlight the importance of new team members in shaping company culture and identity. Especially the hiring of a new CTO was brought up as critical for developing team-building practices and bringing a feeling of *"unity"* to the team.

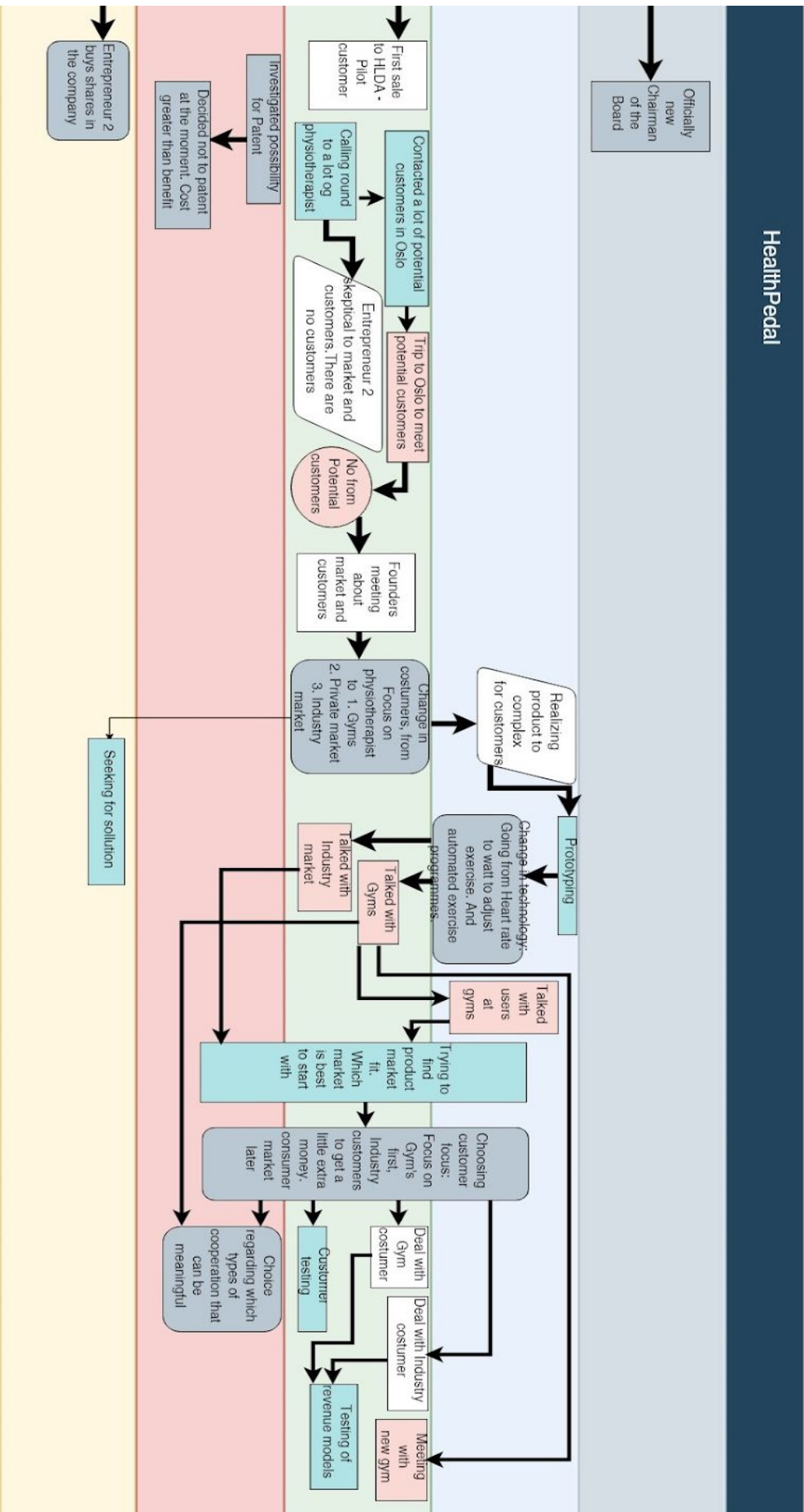
4.2 HealthPedal

HealthPedal is developing a smart fitness device that automates interval-training on spinning bikes by automatically regulating the resistance in the bike to its user. Ethan, the founder of HealthPedal, had the idea for a device that would optimize interval training based on heart rate in early 2016 because he wanted interval training to be more accessible and available. The company was not founded before March 2017. Ethan is a subsea engineer and started at NSE, a venture-creation program at NTNU, for his masters degree in the fall of 2016. He applied for two different sources of soft funding grants in the spring of 2017 but was denied both, getting feedback that the idea was unrealistic and that he was naive about the competitive space. Unfettered, he bought the equipment needed to build a prototype himself. While building the prototype, Ethan cold-called and reached out to potential customers getting feedback on his idea. In June 2017 he met a representative for the Association for Heart and Lung Diseases (HLDA) who showed great interest for the idea. The relationship with HLDA would continue to grow and shape HealthPedal's strategy over time. In August, another entrepreneur joined as co-founder. Based on the feedback from HLDA, they decided to focus on designing, producing, and selling the product for clinical use - rehabilitation centers, hospitals, and physiotherapy clinics. HealthPedal based the product development on feedback solely from HLDA and assumed that they were representative for the rest of the customer segment. By June 2018, HealthPedal had successfully applied for a 1 M NOK research grant and had recruited a COO, Vilma. In November 2018, they conducted their first sale to HLDA, and in December, one of Ethan's mentors joined as chairman of the board and became actively involved in strategic discussions. This first sale to HLDA made HealthPedal confident on their product, and therefore they started a sales-meeting tour in Oslo. This did not turn out exactly as planned.

In January 2019 Ethan and Vilma contacted over 50 potential customers and booked meetings with physiotherapy clinics. They received positive feedback in the meetings but failed to close any deals, with the clinics citing cost and too much administrative work. Both Ethan and Vilma realized that they needed a change in direction. They decided to pivot and decided that they wanted to develop, produce, and sell their device to commercial gyms and consumers, as well as making significant changes to the product; simplifying the use. By April 2019, HealthPedal had signed commercial contracts with both commercial gyms and office gyms for their device.



HealthPedal



4.2.1 Findings HealthPedal

The interview objects from HealthPedal were Ethan and Vilma. Ethan is CEO, who came up with the initial business idea, founded the company and developed most of the company's technology. Vilma is the COO and joined just over a year after founding. Vilma has responsibility for much of the daily operations, marketing, and logistics. Both the founders are active in day-to-day strategic decisions. HealthPedal is a case where most of the time has been put into product development and user-testing. From a strategic point of view, HealthPedal has focused on execution over control, meaning that they strive to get to the market as fast as possible, forgoing formal IP protection.

4.2.1.1 Experimentation

HealthPedal started working with a pilot customer, the Heart and Lung Disease Association (HLDA), which defined much of their early strategy and product development. HealthPedal has, because of the partnership, experimented a lot with users from the start. The partnership gave HealthPedal access to a large user-base, which made it possible to test their product on many different users and thereby to refine their technology. This partnership, therefore, gave HealthPedal huge potential for experimentation within the technological solution, but at the same time, it constrained experimentation with other technological applications and customer segments, which led HealthPedal on a path that took a considerable amount of time to divert from. As stated by Vilma: *"I didn't start contacting other clinics before late autumn, by the end of 2018, or early 2019."* In the autumn of 2018, they had an intensified testing period with other users than those of the pilot customer, where they experimented with different technical solutions on outliers of their user groups to test the robustness of their technology. Vilma stated: *"It was important testing it with users, and get real data. So it was evidently a lot of user-testing that made us move forward."*

HealthPedal conducted a series of customer meetings at the start of 2019, contacting over 50 potential customers. During these meetings, they presented different their prototype solution and different business models but failed to close any deals. This market experimentation made it evident that their technology caused too much administration time on a process which was supposed to be automatic and therefore made them realize that they had to make a change. As a result of this, they had many internal discussion about how to monetize value from their technology and decided to look at other customer segments, such as gyms, private markets, and corporate customers. Because the new potential customer segments had other needs than their initial segment, they also had to rethink their core technology. Ethan experimented with different technological solutions by testing them on friends, eventually landing on a simpler version of the technology that used Watts (energy produced) as a metric rather than heart rate, significantly simplifying the entire product set-up and use. This led HealthPedal to explore new markets by

experimenting with different business models, pricing schemes, and customer segments. As Vilma said: *“We need to find where we get the most traction in the beginning.”*

4.2.1.2 Feedback

HealthPedal’s early partnership was instrumental in shaping their experimentation activity. This experimentation generated much feedback from the given customer, which helped them take their product from a prototype to a working MVP. The only problem with this feedback was that it only represented one small, niche customer, and was not representative for the rest of the customer segment. Ethan said: *“... in theory it should be the same, and it should work the same, but HLDA was a very unique actor, we found out.”* The feedback gained from experimenting with the pilot customer kept them on a strategic trajectory regarding technology that was not validated in a broader context. In the autumn of 2018, they understood that their product needed to be tested with other users than those from the initial segment, and therefore started an initiative on user-testing that went on for the rest of the year. As Vilma stated: *“We then had a useful prototype, which still was pretty crazy, but it worked. So the important thing was to test it with customers.”* Here they got much feedback on the user experience of the product and also how the product worked with different users. As Vilma said: *“We had to think about it, and realized that we had to make it simpler. Fewer choices and automate the whole process.”* This feedback made it evident that they needed to automate more of the processes, since many of the people that were supposed to use it did not have the knowledge of the initial segment, and were therefore unable to tweak the product for each session.

In the following January, HealthPedal went on a sales tour. In these meetings, they got feedback on their product, value proposition, and business models. The people they talked to liked the concept but were not willing to commit to a purchase. Vilma said that: *“They were hyped in the meetings. And then we got no after no the following week. It was too expensive, or just too much to get into, new systems. At this point, we both realized something was wrong.”* This made the team realize that they needed to change their customer segment. Therefore, the team conducted a lot of market research in the following period, talking to gyms, private users, and corporate customers. This provided feedback and confirmed the need to automate the process even more.

4.2.1.3 Commitment

The partnership that HealthPedal entered into represented a significant commitment at an early stage of the firm’s history. The positive feedback received from the partner made them commit to traveling down a path that sat a clear direction for technology development and customer segment, which locked their strategic trajectory for a given time. Ethan stated that: *“... since we got the continuous confirmation from HLDA, in some way we just continued like that. So there was never any dialogue with other customers along the way.”*

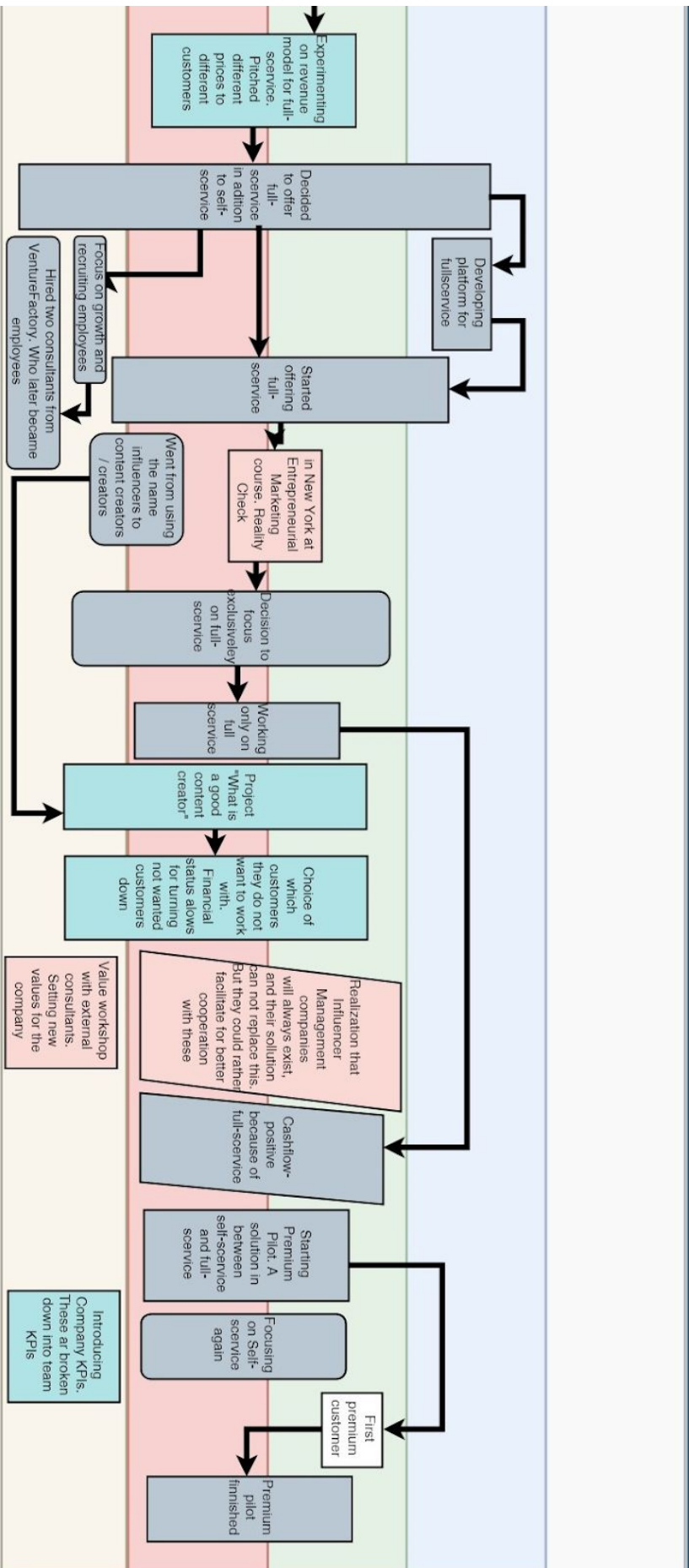
HealthPedal has also committed by bringing in new people to the team. First, by bringing in a new entrepreneur, who shortly after left the startup venture, and secondly by bringing in Vilma in the autumn of 2018. Vilma had been skeptical about the initial choice of customer segment since before she joined the company, and brought up the issue internally several times before they as a team decided to pivot to a new customer segment.

During the autumn of 2018, the founders also investigated the possibility for submitting a patent, but decided that this commitment only would slow them down, lacking a definite upside, as stated by Ethan: *“Maybe it scares off some competitors, but it would be at a too great cost, compared to what we get in return.”* At the start of 2019, they scrapped their customer segment and re-engineered their core technology. Being quite low on resources, this represented a significant commitment to a new trajectory.

4.3 InfluMarket

InfluMarket is a two-sided platform that connects brands with influencers, along with the tools needed to contact and execute an influencer marketing campaign. The founder, Martin, is a business graduate with experience from Facebook, commercializing their products in the Nordics. He went on to work with several other digital services before deciding to found InfluMarket in January 2016. A first version of the platform was launched in March 2016. A second co-founder named Mia joined the summer of 2016, and in the fall of 2016, Ken, the growth manager, joined the team. During the winter of 2016, both founders attended an Innovation Norway accelerator in Silicon Valley. In April 2017 the company raised 9.5 M NOK in a seed round. At this point, InfluMarket's strategy was to build the platform as a self-service solution, where brands and advertisers would coordinate and execute their campaigns using InfluMarket's technology. While they successfully managed to recruit many influencers to their platform, growth in terms of activity from advertisers was low. Martin describes the firm's strategy at this point as *"it would be wrong to say we had a strategy, but we did have a lot of hypotheses (...), and then we find out that they don't make sense, or at least a lot of them don't make sense. Then we start tweaking."* Initial customers were chosen based on Martins existing network in advertising, and the technology was developed in house.

Having failed to obtain significant activity on the platform by the summer of 2017, the founders had decided to pivot by starting to offer full-service to customers. This meant that InfluMarket would coordinate and execute the whole campaign. To test this new approach, they decided to conduct a simple experiment - use Martin's holding company to sell a campaign to a major brand and use InfluMarket's platform to execute it. This campaign received strong customer support, and Martin and Mia took this as a proof of concept to execute the pivot. This was a major change in the business model that required more employees and a new approach towards sales and marketing, and by May 2018, they decided to invest in the full-service concept solely. This change brought much business to InfluMarket, and they were cashflow-positive by Q4 2018. InfluMarket's current strategy is to continue with the full-service model while allowing the development of the self-service platform to piggyback on that traction. In the long term, InfluMarket is guided by their mission and vision, set goals and track performance, but do not work explicitly with strategic processes beyond this.



4.3.1 Findings InfluMarket

The interview objects from InluMarket is Martin and Ken. Martin is CEO and has been part of all strategic decisions since the founding. Ken started in InluMarket in October 2016 as a marketing intern. Since then his role has evolved, and today he holds the position as growth manager. InluMarket has had a clear preference for rapidly commercializing their product, and entering into direct competition with incumbents.

4.3.1.1 Experimentation

Having failed to get traction for the self-service tools on their platform, InluMarket needed to explore new opportunities; Ken explains: *“We had to explore a solution that included full-service because the revenue from self-service was not good enough, so it made us look for options.”* This was the result of accumulated feedback over time, as Martin explains; *“Many wanted to work with influencers, but neither had the know-how nor the resources to do it. So we thought, screw it, we’ll just do the job.”* Further, they experimented with testing if a full-service solution was wanted. Martin conducted a campaign for a customer through his holding company; Martin stated: *“We sold a campaign without knowing how to do it technically, so I conducted that campaign through my holding company so that it was the “customer” who used our platform and invoiced the advertisers [real customer]. The customer was happy, we saw we could earn money from this if we do it right, so it was proof-of-concept enough.”*

However, even though this provided a proof-of-concept, they still lacked a verified revenue model for full-service. Again experimentation played an essential part in enabling them to offer their new solution as Ken describes how they found a feasible model: *“Martin and Mia went to sales meetings and identified what worked. Today the customer needs a minimum of X in influencer budget, and our fee is a minimum of 25,000 NOK to be qualified for a campaign. In the beginning, we had no such limitations. We tested everything, and after a while, we understood that we should take a minimum for the service itself.”*

4.3.1.2 Feedback

Feedback has also been an essential aspect of InluMarket’s process. It is evident that several trips abroad have provided valuable feedback for gaining perspective. One of the episodes being highlighted by both Martin and Ken is the trip to USA where Martin and Mia attended TINC in Silicon Valley, as stated by Ken: *“They got some tough questions in the USA, and when they came back from the trip questions were raised regarding: Are we actually doing things right? [...] They got some sort of reality check and realized that things need to add up. Both the economy but also a more long term vision.”* Ken believes that this was the event that triggered the idea of pivoting by offering full-service. Another important trip was the one Mia took to Slush in Japan, where they were tested on how they could facilitate a platform in the future that could be implemented in other countries, with different influencer-channels. This was feedback

that according to Ken led to some internal discussions in the team: *“In 2017 we talked about if it could be an alternative to white-label the platform and sell the platform itself to other actors.”* Both Ken and Martin emphasize that these trips have been necessary for getting external feedback that put things in perspective.

It is important to highlight the link between feedback and experimentation conducted in the process of offering the full-service solution. The whole process of going to full-service was triggered by feedback. Martin states: *“At some point, we had to acknowledge that it is hard to get people to use self-service.”* When asked about what led to the choice of offering full-service, Martin answered: *“It was aggregated feedback over time. We talked about it for a long time, and in the end, we realized we had to do something [...] Based on feedback, we knew what they needed. They needed us to do the job.”* So the feedback has been important for realizing that a strategic change was necessary, but also for validating the needs they were not solving. This is exemplified by the positive feedback from the customer during the first experiment on full-service, and also through the feedback on revenue model through sales meetings. The experimentation has not only been important for getting feedback, as previously stated, but also for calibrating the strategic choice of what to offer and how to offer it, before committing.

4.3.1.3 Commitment

There are several examples of commitment that shaped InluMarket’s strategic process. An example is the choice of offering full-service in addition to self-service. This also indirectly led to the choice of investing exclusively only on full-service for a period, which left the other part of the business in a stand-still. These choices led them down a path which ultimately sparked the idea for and the execution of their premium solution - a middle ground between full- and self-service.

The choice to offer full-service is an outcome of experimentation. This was a big commitment as Martin presents: *“This was an additional product, but it is a product that demands more resources and more employees, so it was a big decision because you need to build a bigger team.”* When committing to full-service, they knew a bigger team was needed. Therefore, in addition to committing to a new service, they had to commit resources into recruiting and training employees. When asked about the implications of the choice of offering full-service, Ken answers: *“Concrete changes... One of them is employees. The more full-service campaigns we have, the more employees we need because we need people to run these campaigns. Now we have four people on the customer success team, that handles all the campaigns, and it is one of the largest changes that can be seen, that have an impact on the economy and the whole company.”* Even though choosing to offer full-service was a huge commitment, it enabled them to be cash-flow positive in Q4 2018, and it also provided feedback relevant for the further development of the self-service according to Martin: *“Full-service was a conscious choice to get customers in-house. We sit along with a customer success team that works with the product every*

day. So we are sitting among those who are using the platform the most, giving a good flow of feedback.”

Offering full-service had its advantages, but it also created a problem; Since they now offered two services, they had to split focus between commitments. Martin stated: *“A challenge was that we split our focus between two key areas. We did it for a year, and it went ok, but nothing skyrocketed. So last year we changed focus; All resources in the company would go to full-service, and self-service would piggyback on that development. Now we’re moving our focus back because we are sure we can find a good solution for self-service.”* It is a drastic decision to put a part of the core business on hold, but it seems that it was worth it, as Martin states: *“We have been given time to figure things out, things we otherwise would not have figured out in time. We are still in the process, but now we have started to break some codes that seem to work on self-service.”*

Offering the premium is a new commitment, and they have committed resources in the developing and testing phase of the service. As Ken states: *“The product is much more thought through, and it has gone through several of the teams, and we have actually tested with several different companies.”*

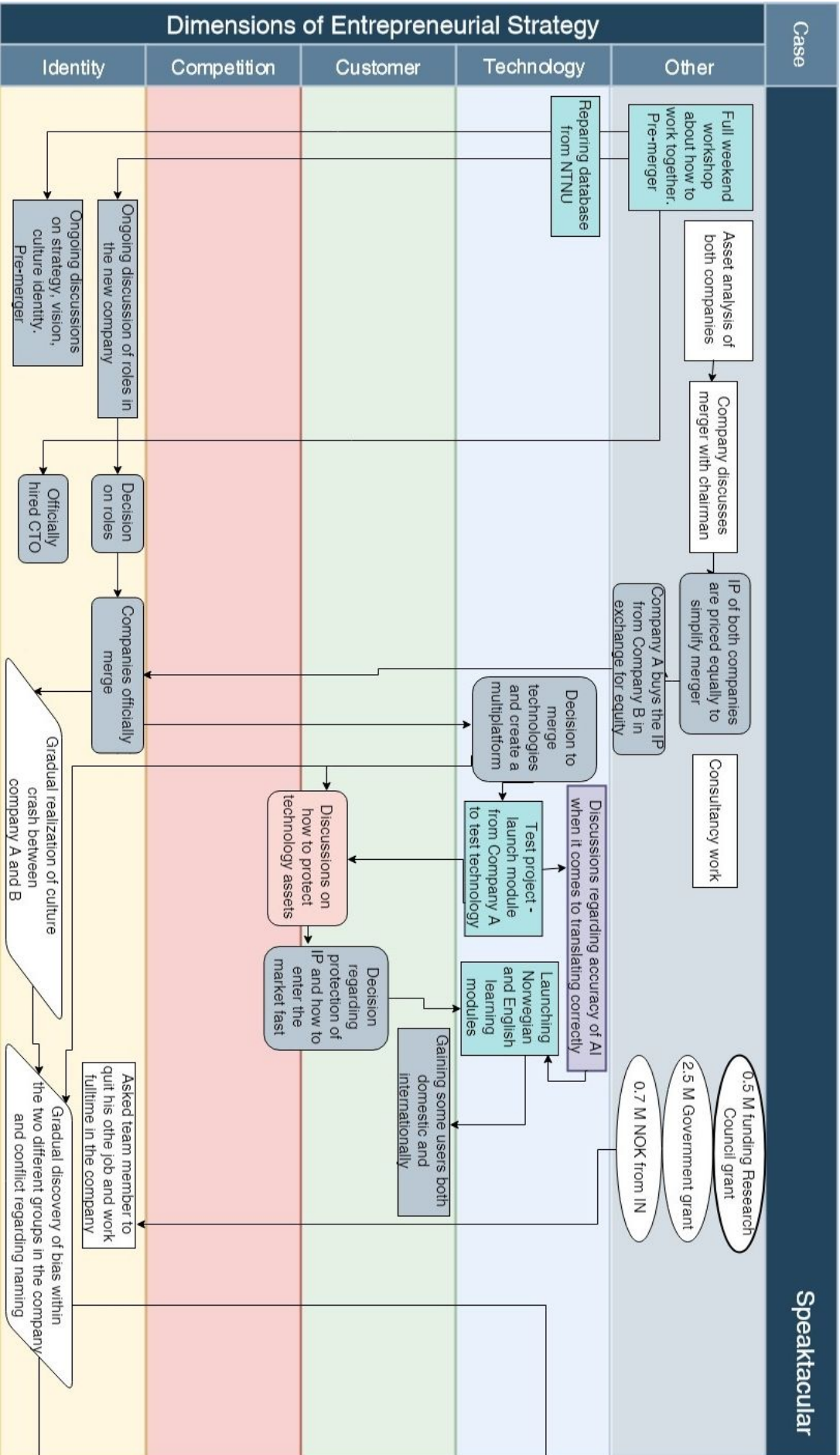
4.4 Speaktacular

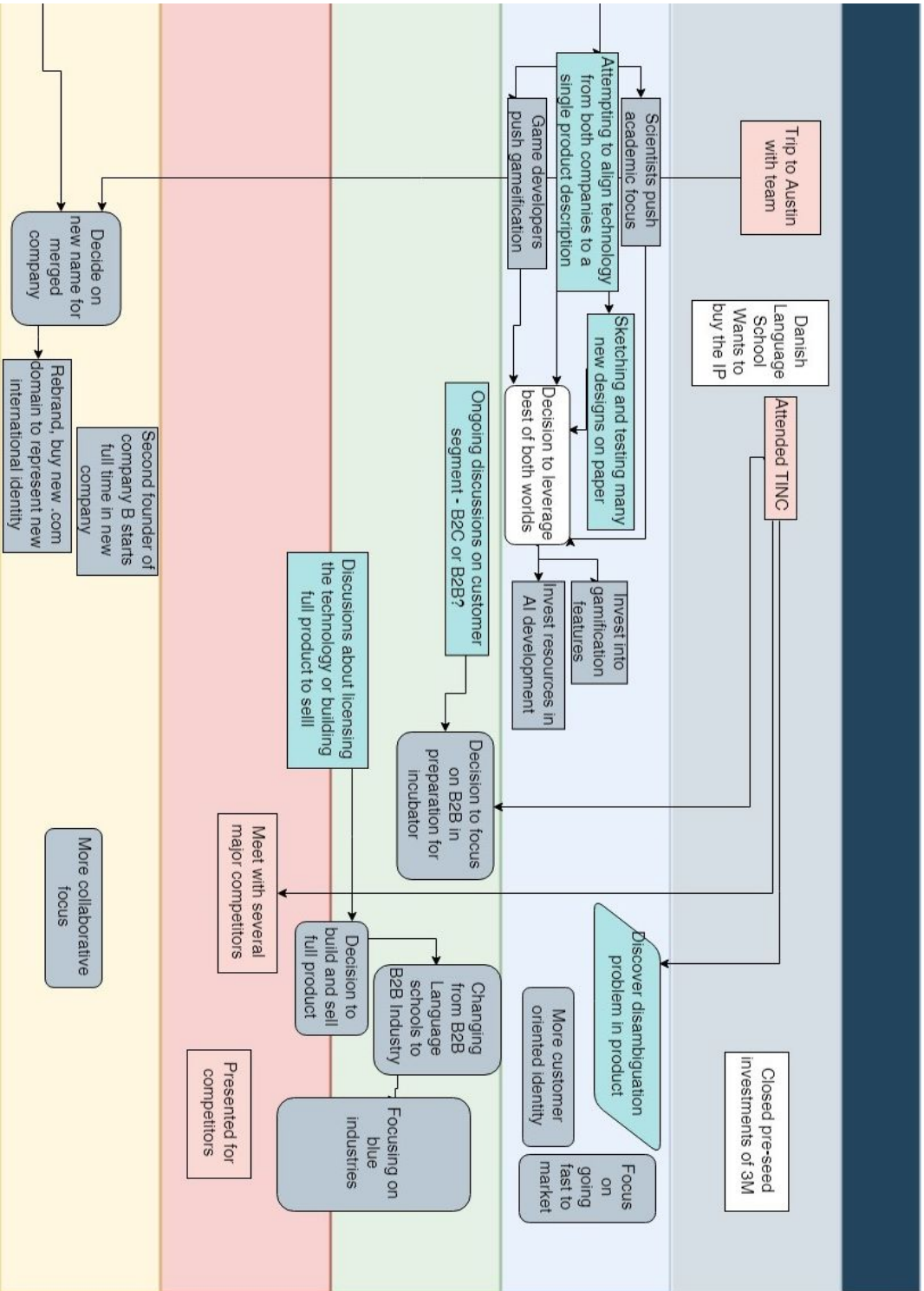
Speaktacular develops gamified language learning tools to help companies train foreign workers in domain-specific vocabulary. Speaktacular is a result of a merger of two startup ventures. The first, AutoLingo started as a research project on Natural Language Processing (NLP) at the Norwegian University of Science and Technology in 2014 and turned into a technology transfer commercialization project soon after. By 2016, the project had failed, lacking both funding and team. Maya was recruited to take over the project, and the company was incorporated in May 2017. Maya set a new strategy for the company, evaluating several aspects such as IP, customer segment, and investments in technology.

The second startup venture, WordMash, was founded by two game developers, one of them being Omar, identifying the need for domain-specific language training. The other founder was a foreign worker stationed in Norway, and therefore needed this product himself.

In the summer of 2017, Omar and Maya met, and both soon realized that there were significant complementarities between the two startup ventures technology-wise and started to consider merging the two companies. Over the next months, both teams held strategic workshops, raising questions related to identity, roles, and a common strategy, and in October 2017 the companies officially merged. A significant source of friction was the different backgrounds of the companies - AutoLingo was highly academic and research-oriented, while Wordmash's founders both came from the gaming industry. Much time was spent on strategizing and laying plans for how to build a new identity. This time the strategy process included not only Maya but the entire team, as well as the board. A new strategy had to be laid out, both for how to integrate the two companies in the best way possible and a new commercialization strategy. The customer segment changed from language schools to industry. Technology-wise, the focus was still oriented towards exploitation of the underlying technology, but there were also long-term investments in exploring new technology that might have a slow return of investment. The company was still highly oriented towards execution, launching new features, and going to market with their technology. The company post-pivot is even more heavily oriented towards collaboration, stating that *“the way Speaktacular will grow to become really big is through collaboration with existing companies,”* leveraging their IP and technology to improve on other's services.”

The Visual Map presented below is a visual map that starts with the event where the two startups start working together through a pre-merger workshop. The visual maps of AutoLingo and WordMash up to this point can be found in Appendix 2 and 3 respectively.





4.4.1 Findings Speaktacular

The interview objects from Speaktacular are Maya and Omar. Omar is CPO in Speaktacular, and Maya is the CEO. Both Maya and Omar have critical strategic roles in Speaktacular, as well as in their startup ventures before the merger. Speaktacular has had a clear preference for execution in order to rapidly commercialize their technology while engaging in competition with existing solutions. Since this case represents a unique case of two separate companies merging to one entity, we present findings from both companies before the merger, as well as for Speaktacular once the merger was complete.

4.4.1.1 Experimentation

When asked about the initial strategy of Wordmash, Omar said: *“The strategy was simply to build something; something that worked, and to get it tested as soon as possible.”* The primary focus, in the beginning, was on technology development. By getting it out quickly and testing the market, this would provide feedback to base their development upon. The technology enabling the production of Wordmash was Natural Language Processing, a technology based on machine learning. Omar explains: *“Part of what enabled us to develop this idea was that the technology was mature enough. Finding that technology made it possible to develop our product.”* Despite, getting there was not a straightforward process, as stated by Omar, they had to explore different applications of the technology; *“It was early technology-wise; the technology has developed a lot over the last four years. We were also beginners in this field, so we had to learn a lot by ourselves.”* The entrepreneurs utilized technology experimentation in order to learn. Without this experimentation, the entrepreneurs would not have acquired the skill-set needed to develop the product they launched; A skill-set they still use today as this technology still is a core part of their product.

AutoLingo also experimented on technology. They identified an interesting technology but were unsure if it was the best fit. Maya and the team chose to research the technology: *“So we let the technical team look at the technology to evaluate if it was something we should focus on, but it turned out that it was a bit intricate.”* The main problem was that much R&D would be needed. Maya said: *“When you are in a startup, you don’t have the time. When I heard estimates of the time needed, I thought: We’re not going to do this. We are going to run a startup and get things out in the market to get customers.”* Maya and her team chose a high pace at the expense of a technology that potentially could have been valuable. By conducting relatively commitment-free learning, Maya and her team were able to make an informed decision without committing to experimenting with the technology.

An important event for Speaktacular was the first launch they had together as a team. Omar stated: *“We launched Norwegian Pronunciation and English Pronunciation. This was important for us because it was the first launch that the team did together. It was really exciting and [CTO]*

got his proof that we don't need to be perfect, we can launch something that isn't optimal, but we still need to prove the willingness to pay." This is market experimentation was both to get feedback from the market but was mainly motivated by a need for the whole team to work on a project together.

Both founders were aware of the differences in background and experience that could potentially cause friction. Once the companies had officially merged, a decision to launch the AutoLingo app was made, as it was close to completion and they wanted some user feedback. Maya explains *"It was our first test project, and it was in this period where we identified a lot of the bias we had, and where AutoLingo and Wordmash came from - and the need to unite."* This initial test project highlighted differences between the teams, which ultimately would shape their final product strategy. Maya explains how this changed the dynamic in the team: *"If I was laying a new strategy for how we were going to work, I had to open up to creative chaos, so that it could unfold during the week before I could structure it."* This led to the whole team testing and developing new processes for how their product could become more entertaining: *"There were thousands of design sketches and meetings with the researchers on how to turn it into a game."*

4.4.1.2 Feedback

Omar states that Wordmash had no initial strategy on how to commercialize their idea, but as Omar applied for several public grants, he had to form an initial strategy: *"Writing an application to Innovation Norway requires that you sit down and formulate things in a way that makes you think. You are challenged on several things which are critical for commercialization."*

After the merger, the differences between the teams took its toll on product development, as Maya explains: *"There were discussions between the R&D-team who thought it couldn't be too playful or creative, and the game developers who pushed back and said it couldn't be too focused on research as we'll never get it user-friendly. Without those discussions, we would never have been set on the path we are today."* These internal discussions worked as feedback and shaped the product strategy, and the teams were aligned by realizing the complementarities between the two views, deciding to play to the strengths of each side - the gamification and the research.

Externally, Speaktacular has actively pursued feedback from industry incumbents in order to better understand their positioning. Maya explains: *"We've been very open externally, and have been meeting competitors and told them what we are developing to get feedback on what we should focus on."* This is reflected in their new strategy for growth, which is to collaborate with incumbents, leveraging their unique technology.

5.4.1.3 Commitment

Omar had international ambitions for Wordmash from the start. This led him to make an early commitment to a business partner in the US. Omar explains: *“It was a strategic choice we took in order to have an international focus. His job was to raise funding in the US. He wasn’t able to, and it was a huge miss, and a waste of time.”*

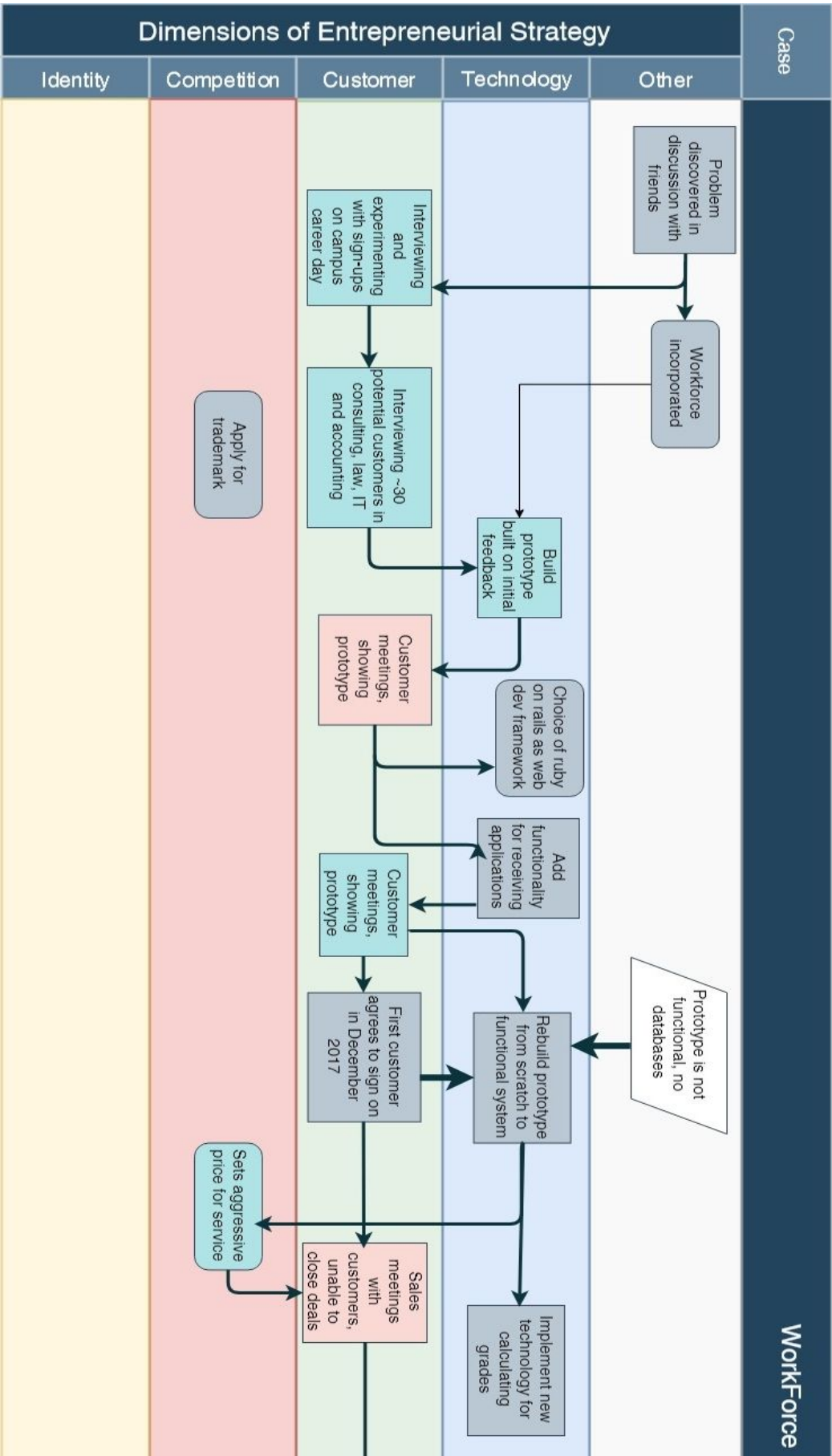
Speaktacular represents a unique case in this thesis, considering that it is the result of a merger between two early-stage startup ventures. This process of merging two different teams can be viewed as a huge commitment with a series of sub-commitments. One sub-commitment is the full-weekend strategy workshop pre-merger. Interestingly, this workshop was entailed discussions about future technology, strategy, and identity, but the main reason for having the workshop was the two separate companies testing if they can work with each other. Both Omar and Maya highlights this event as one of the most strategically important events in the history of Speaktacular. Maya points out the importance of this workshop in understanding the differences in identity between the two teams. *“We needed a strategic gathering before we merged the companies where we didn’t just talk about strategy for the company, but what the company shall become. We realized that we came from very different domains.”*

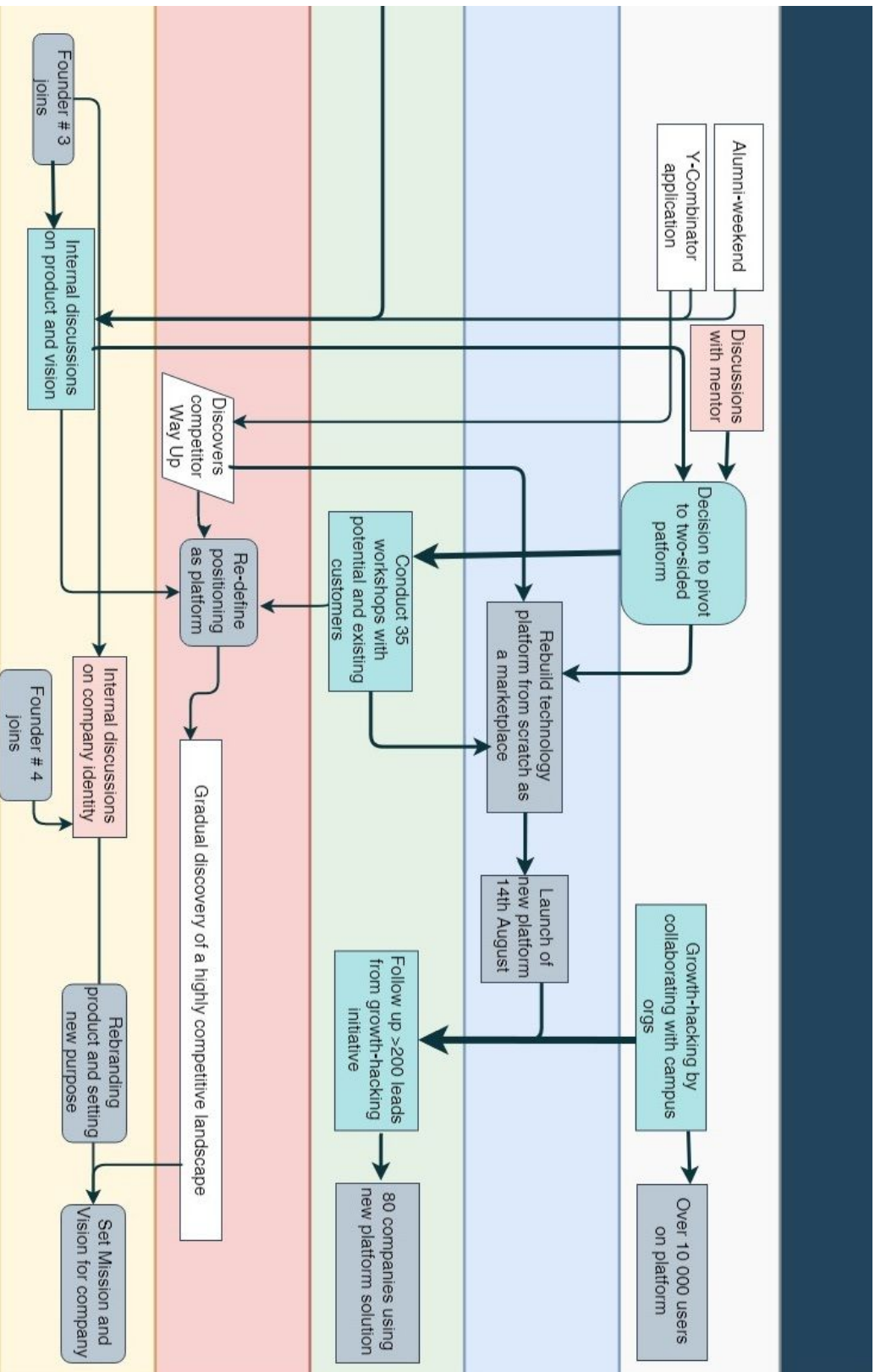
Of course, the merger between the two companies was in itself a significant commitment which affected the strategic trajectory of the new company - technologies had to be merged, identities had to be aligned, and a new commercialization strategy needed to emerge. Together, they spent much time conducting strategy workshops, as Omar explains: *“We lost focus on the customer and release because we had to take two steps back and merge technology and the companies.”* This led to a series of decisions based on the network and leads they had as a company, as well as the decision to attend an incubator program, which turned out to cause a commitment: *“We had to choose a path because we were going to TINC. We were going to meet a lot of mentors to present our strategy, and there was no point in meeting mentors and saying that we were B2C if B2B was on the table. So we chose B2B, and it has been B2B since.”*

4.5 Workforce

Workforce is a SaaS-enabled marketplace for businesses looking to recruit students. In addition to being a platform where students and businesses can meet, Workforce offers several tools that simplify the recruiting and follow-up processes for businesses. The founders, Phil and Jon, are both industrial economics students and finish their masters degree at a venture-creation program at NTNU. Previously, they have both had solstice in a student organization that facilitate contact between students and industry. The idea behind Workforce started in July 2017, when the two founders, Phil and Jacob were discussing with a few friends how much work was involved in student recruiting for consulting firms. They spent the next months interviewing HR managers, consultants, and other stakeholders in consulting, legal and financial firms about these problems. In November 2017 they decided to found the company. During this period, they conducted several meetings with potential customers, showing them mock-ups and prototypes of a web-service in order to better understand the problem. In December 2017 they acquired their first customer and spent Christmas developing the service they had promised - a web-based tool that allowed students to create an 'instant CV' and share with a given company, and tools enabling the company in following up and contacting the students. However, during the following months, the team struggled to close the customers they had contacted during the fall.

In March 2018, two critical events happened. During an alumni event at the venture-creation program they attended, the team conducted a workshop with entrepreneurs and professionals who provided much input and asked critical questions about the future of the product. Workforce also applied to Y-Combinator, a famous Silicon Valley incubator program. During the interview process for Y-Combinator, they were especially pushed on what made their solution unique. The team had also encountered a user-experience problem, where students who wanted to use Workforce had to make individual profiles for different companies. The team decided to pivot, rebuilding the entire product as a platform solution and rebranding it. Companies would use it for its user-friendly tools and pool of talent, while students would use it to get in touch with potential employers. The new product and brand launched in August 2018. To achieve initial growth on the platform, the founders leveraged their existing network to enter a collaboration with the university campus recruiting day, offering all companies present to use their platform to gather sign-ups from students at their stands. This turned out to be a very effective strategy, and they repeated it with several other universities nationwide, signing up over 200 companies and over 4000 students by November 2018. Workforce continues to grow its platform and is now looking to explore new ways of monetizing their product, such as introducing transaction-based fees.





4.5.1 Findings Workforce

The interview objects from Workforce is Phil and Jacob. Phil is CEO and responsible for the daily management of the company, and Jacob is CPO and responsible for planning and execution of product strategy. Both have been with the company since its inception and have been the main strategists in the company. Since its inception, Workforce has had a clear preference towards execution and rapidly commercializing their product, while leveraging technology exploitation to do this. Workforce has also had a clear preference towards competing with incumbents.

4.5.1.1 Experimentation

Workforce has been heavily involved in market experimentation, especially during its early product development period. One of its initial experiments was to attend a campus recruiting event where many of Workforce's potential customers were present, signing up at their stands and asking to be followed up as potential candidates, which the companies did not do. Both founders would bring up this point in sales meetings in order to highlight the current problems they were solving with their solution. They built a non-functional but clickable prototype based on initial market feedback and immediately booked meetings to show the prototype to a group of potential customers in the fall of 2017. Based on the feedback from these meetings, new functionality was added, and a new prototype was built. This was again shown to potential customers, and in December 2017, their first customer, an investment bank, agreed to purchase their system. Jacob stated: *"Then we had to go back and actually make what we said we were going to make. Until then it was a house of cards, nothing worked, and we didn't have any databases or anything, we had hardcoded everything. So we spent Christmas actually building it."* This market experimentation allowed Workforce to improve their product-market fit while keeping investments in product development to a minimum.

During sales meetings early on in 2018, Workforce experimented with the pricing of their product, and based on the deals which they were unable to close, they found a pricing scheme which was suited to the majority of their customers. Post-pivot, Workforce experimented by entering into a partnership with campus career organizations and creating a sign-up function for companies attending career days. Once this was found to be highly successful at the founders home university, they repeated the exercise nationwide.

4.5.1.2 Feedback

Before product development even started, the founders were involved in commitment-free learning by interviewing 30 potential customers and gathering feedback on the existing workflow, processes, problems, and solutions that were currently in use. The initial prototype for Workforce's solution was entirely based on this feedback. During their pivot to a two-sided platform, they conducted a similar process - setting up meetings or calling 35 existing and potential customers, mapping out pain-points and needs for their new platform.

Workforce highlight feedback from an application process to Y-Combinator as a trigger for reconsidering their strategic trajectory; Phil explains: “..when we applied to Y-Combinator, we had to find out: *Why is this something unique? Why do we stand out, and what makes us different? And we had to re-think things a little and go deep inside ourselves. It’s easy to not reflect over these things, but when you write an application which is 10 pages long, and you know only the best startups are accepted and put a lot of effort into it - that makes you reflect.*” Both founders also highlight feedback from a particular mentor with expertise within platform solutions as necessary for deciding to pivot.

4.5.1.3 Commitment

Some of the experimentation activities conducted in the early product development phase led to parts of the product being built on a shaky foundation, which in turn led to the decision to scrap the existing code-base during the pivot and build the product from scratch. This process of showcasing prototypes to potential customers also shaped the features and functionalities of the product to a certain extent and created expectations for the final product. After the product was re-built, Workforce entered into partnerships with campus organizations to achieve initial growth on the platform. The commitments that these partnerships created affected the development of the product, as Phil explains: “*So it was these campus collaborations that were important for us during this period, and making great tools for the companies. So we still haven’t moved the focus to the student side [of the platform].*” So while this experiment was highly successful, it clearly illustrates that there was an opportunity cost related to its execution.

5. Cross-Case Analysis

In this chapter, we will present the cross-case analysis, based on the findings from the previous chapter. The results from this cross-case analysis will lay the foundation for the discussion in the following chapter. We end this chapter by reviewing and answering the research questions laid out at the beginning of the thesis.

In the analysis, the recommendations of Eisenhardt (1989) have been followed, and several tactics have been used to analyze the data. Both the interview transcripts, secondary sources of data such as funding applications (Funmotor, HealthPedal, Workforce), newsletters (InfluMarket), and media coverage (InfluMarket, Speaktacular) have been used as data in the analysis, and also provided the foundation for the extensive visual maps presented above. The visual maps have been used in the following ways; the main themes of experimentation, feedback, and Commitment have been compared within and across cases. We selected pairs of cases and listed similarities and differences. Lastly, we split the data up into two distinct groups; hardware and software startup ventures, using the visual maps to identify patterns within and across these groups.

5.1 Main findings

For the purposes of this analysis, we distinguish between technology and market experimentation. While there is some overlap, technology experimentation is defined as activities that explore different possible applications of the technology and investments into R&D. Market experimentation shares the definition of Contigiani (2018); the disclosure of an incomplete product to the market before market entry.

The authors have also chosen between two main types of feedback, Market feedback and Professional feedback, primarily based on the source and context of the feedback. Market feedback is regarded as all feedback from within the industry in which the startup venture operate, and is often a consequence of the market experimentation presented by Contigiani (2018). This feedback includes direct feedback from specific customers and competitors, but also more vague feedback from the market as a whole such as in the case of HelthPedal, InfluMarket, and Workforce who highlighted that they at some point struggled to get customers. Professional feedback, on the other hand, contains, but is not limited to, feedback from mentors, incubators, feedback on applications, advisory board, and the board of directors. Feedback between entrepreneurs within the startup venture, which could be considered Internal feedback, has not been under investigation since the entity of this study is the startup venture as a whole and not the individual entrepreneurs.

As in the introduction of this thesis, we adhere to the definition of commitment as “the tendency of strategies to persist over time” (Ghemawat, 1991). The authors have delineated three distinct types of commitments based on the early findings of this study. The different types of commitment are Technological commitment, Team commitment, and Customer commitment. Technological commitment is exemplified by Funmotor, who invests heavily in their technological development in a given trajectory. In the case of Speaktacular, the merger exemplifies team commitment. Customer commitment is exemplified in the case of Workforce, who needed to make the product they had sold to the customer in advance.

As part of the cross-case analysis, two groups were identified. Funmotor and HealthPedal are hardware-cases with relatively high experimentation costs, both in the form of appropriability and time needed to iterate on product specifications. InfluMarket, Speaktacular, and Workforce make software which is characterized by relatively low experimentation costs and shorter product development cycles. Throughout the analysis, patterns within these groups emerged, and while there are differences within the group, these will be referred to as distinct groups where applicable.

Table 5 presents the different types of experimentation, feedback, and commitment found in the data analysis. Based on primary and secondary data sources, we have summarized the purpose and/or impact of the category. By impact, we mean the degree to which it has shaped the current strategic trajectory and the strength of the commitments.

	Funmotor	HealthPedal	Influmarket	Speaktacular	Workforce
Pivot Trigger	Low credibility in industry and hiring of new CTO	Low interest from target segment	Low traction on platform	Merger between two very early stage startups	External feedback from mentors and incubators
Pivot Type	Product and business model	Customer segment and technology	Product and business model	Product and customer segment	Product and business model
Hardware / Software	Hardware	Hardware	Software	Software	Software
Attitude to innovation	Control	Execution	Execution	Execution	Execution
Attitude to incumbents	Direct competition	Direct competition	Direct competition	Collaboration	Direct competition
Experimentation					
Product experimentation	Investing into technology exploration prior to market disclosure	Mostly based on feedback from customer	Technology exploitation to get to market quickly	Balancing exploration and exploitation while getting market feedback	Technology exploitation to rapidly verify potential and execute
Market experimentation	Only after securing patent pending and verifying technology.	Experimentation with one partner, not exploring multiple paths	Experimentation in order to verify hypothesis for pivot	Releasing early versions for user feedback. Feedback from incumbents	Customer workshops using prototypes to improve product-market fit
Feedback					
Market feedback	Defines choice of “optimal” vertical to pursue	Improving product market fit for specific vertical	Verifying hypothesis for pivot.	Shaping product direction and strategy	Improving product market fit, business model.
Professional feedback	Negative feedback shaped identity, mentoring	Mentoring shapes strategy, forces reflection	Forces reflection, partially triggering pivot	Mentoring shapes identity, forces decisions to be made	Forces reflection, partially triggering pivot
Commitment					
Technological commitments	Heavy investments in technology s-curve	Shaped by market feedback. Rebuild after pivot	Few, did not shape strategy significantly.	Investments in tech shaped market strategy and product	Few, rebuilt service several times from scratch
Team commitments	Important for identity and market strategy	Important for pivot, identity.	Pivot created significant commitments	Merger created significant team commitment which shaped strategy	Important for identity, significant commitments
Customer commitments	Consciously avoided customer commitments	Heavily committed to positive feedback	Pivot created significant commitments	Early release created stakeholders and expectations	Disclosure of prototypes created significant expectations and stakeholders

Table 5: Key findings of the case companies.

Workforce, completed more cycles before becoming path dependent. Also, the motivation for experimenting was always in order to learn or obtain feedback, but the specific goals of the feedback also vary widely across cases. For instance, technology experimentation was conducted to explore different applications for it (Funmotor) and to learn more about its core concepts (Speaktacular). Likewise, market experimentation was in some cases conducted in order to obtain market feedback and improve the product-market fit (HealthPedal, Speaktacular, Workforce) or to validate the willingness to pay and test new business models (Funmotor, InfluMarket, Workforce).

Gans, Stern, and Wu (2019) suggest that entrepreneurs should employ experimentation only after having utilized commitment-free learning and optimization until they have reached the limits of learning. They frame experimentation as a choice that ultimately forecloses particular strategic options due to its opportunity cost. While this may be true to a certain extent, some market experimentation comes at a low cost, especially for software cases, while providing distinct benefits in the form of learning, which was observed for both Workforce and Speaktacular. This is especially true when conducted early in the product development process, as adaptation costs are low. While the feedback produced from early market experimentation certainly can cause increased path dependency, it does not have to, while potentially providing more significant leaps in learning than what Gans, Stern, and Wu (2019) consider commitment-free learning.

The motivation for conducting experiments was in most cases in order to obtain market feedback on a given strategy, but as Gans, Stern, and Wu (2019) point out - “it is not only the relative costs and benefits of particular strategies that are uncertain but the intrinsic value of the idea itself.”

They are implying that positive feedback on a particular strategy also increases the estimated value of the underlying idea. They go on to argue that this gives rise to an *inducement effect* - positive feedback does not lead to immediate commitment but instead should lead to further search. In the cases studied in this thesis, we observe that market feedback is the most common trigger for change in strategy. In all five cases, market feedback was valuable in making strategic choices, but the type of feedback and how it affected strategy varies across cases. Some cases, such as HealthPedal and InfluMarket highlight accumulated feedback over time for pivoting, though in both cases a specific event triggered the decision that caused them to act on the feedback. The inducement effect was evident for Funmotor and Workforce, while in the case of HealthPedal, an immediate commitment was made in response to the positive feedback from HLDA.

One interesting finding regarding commitments is related to the process of applying for grants and funding or attending incubators. In all five cases, the founders highlighted one of these processes as having affected their strategic trajectory. The process of applications caused some

path dependency by explicitly making or at least stating milestones or core choices such as customer segment while strategy is still not fully formed. The application and attendance to incubation programs also provided much external feedback from mentors and professionals. We observed two ways in which this affected the strategic process in startup ventures;

1. By inducing critical thinking about the fundamental concepts of the underlying idea, or sparking an internal discussion which ultimately would lead to a shift in strategic trajectory (Funmotor, HealthPedal, InFluMarket, Speaktacular, and Workforce)
2. By committing to certain milestones or goals in the application which caused at least some path dependency to a specific strategic trajectory (Funmotor, HealthPedal)

These findings also confirm and highlight some of the key concepts from the framework developed by Gans, Stern, and Wu (2016). The tension between experimentation and commitment is evident across the cases. Market experiments, such as showing or releasing early prototypes to customers, created both expectations, and shaped the product development process in four of the five cases.

5.1.2 Cost of experimentation

Experimentation bears with it a cost, but that cost takes different forms and affects the strategy process in different ways. The analysis reveals four different types of cost that can increase the total cost of experimentation in entrepreneurial firms.

1. *Intrinsic cost* - the internal resources and capabilities used to conduct and follow up an experiment, including the cost of distributing products. This could be conducting workshops with groups of customers to obtain feedback on a prototype (Workforce), or in the case of InFluMarket, committing significant resources to plan and execute a full-scale marketing campaign on behalf of a client. In other words, the intrinsic cost can be one-off, but may also create long-term commitments and increase risk of appropriability or stakeholder commitment, which are defined below.
2. *Product development cost* - the internal resources and capabilities used to develop prototypes or product versions to be tested with experimentation. This is particularly evident across the two groups of hardware and software startup ventures. The low product development cost of experimentation allowed the software startup ventures to conduct market experimentation more frequently, often rebuilding or making significant changes to the service (Speaktacular and Workforce) with relatively little risk. For Funmotor and HealthPedal, however, the higher cost of experimentation led to longer decision-making processes and ultimately, less market experimentation.

3. *Appropriability cost* - the risk of misappropriation or imitation when conducting market experimentation. This has been explored in empirical studies, revealing that experimentation is less likely to happen when formal intellectual property (FIP) is weak, as it increases the risk of imitation (Contigiani, 2018). This is reflected in one of the cases, Funmotor, where market experimentation only happened after FIP was secured. Interestingly, Speaktacular had no FIP, yet entered into dialogue with major competitors. However, both founders highlight trade secrecy in their innovation.
4. *Stakeholder commitment* - the risk of creating stakeholders and expectations when conducting market experimentation. This has recently been explored by Hampel, Tracey, and Weber (2019) through a process study of managing stakeholder relationships throughout a pivot, highlighting the potential hazards of pivoting once stakeholders of the firm have been established. While Workforce highlights the importance of the market experimentation they conducted in improving product-market fit and understanding their customers better, they also created significant expectations in their target customer segment. They would have to manage these expectations throughout their pivot, which both founders highlighted as a challenge. Experimentation also runs the risk of creating internal stakeholder commitments. The different backgrounds and experiences within a team can create different expectations through experimentation, which may become a source of internal friction. This is particularly evident in the case of Speaktacular. Both the type of experimentation and the results of said experimentation were subject to different interpretations, clearly highlighting the different expectations of the internal stakeholders.

Our analysis reveals that complementarities between these costs exist; the sum of the different kinds of costs are more significant than any single cost by itself. For instance, HealthPedal's pivot to a new customer segment meant validating a new market (intrinsic cost), developing new technology (product development cost) and reducing their reliance on a major partner (stakeholder commitment). Much like complementarities between the core choices of entrepreneurial strategy (Gans, Stern & Wu, 2016), the implication for entrepreneurs is that these costs need to be considered together as a whole when deciding whether to experiment or not.

These costs also reveal the tensions that characterize entrepreneurial strategy: learning and appropriability (Contigiani, 2018; Ching, Gans & Stern, 2018), freedom and commitment (Gans, Stern & Wu, 2016) is evident across the cases - where the cost of experimentation is low, such the case for Influmarket, Speaktacular, and Workforce - the founders, are more likely to experiment.

5.1.3 Market uncertainty

Four of the five cases released early versions of their product in order to obtain market feedback. Workforce, in particular, conducted several market experiments early in the product development process in order to understand the needs of their customers better, and much of their product and business model was based on these experiments. Market experimentation is done in order to achieve better product-market fit, while adaptation costs are still low (Contigiani, 2018). Market experimentation is particularly effective when there is high uncertainty on the demand side, which we will refer to as market uncertainty (Contigiani, 2018). This is evident in four of the cases, HealthPedal, InFluMarket, Speaktacular, and Workforce all develop products or services that are tailored towards an underserved market segment, requiring extensive learning in order to understand who their users are, what kind of tools they would need or how they should price their product/service.

The exception to this is Funmotor, who operate in an industry where the needs of the customers (cheap, efficient motors), market mechanisms, and ultimately, product-market fit in the potential markets are known a priori, thus reducing the need for market experimentation. The uncertainty regarding demand is then reduced to which vertical they should prioritize, explaining why market experimentation happens late in their commercialization process and is mostly what Gans, Stern, and Wu (2019) would consider commitment-free learning or optimization; relying on desk-analysis of a business case and drafting proposals for potential customers and comparing results before committing to building a prototype. This is in line with the conceptual tool of ‘*test two, choose one*’ presented by Gans, Stern & Wu (2019); *entrepreneurs continue to search until they reach at least two alternatives that are ex-ante equivalent in expected value before making a choice*.

We find support for that in situations characterized by high market uncertainty, experimentation is used to improve product-market fit, and that it has a significant impact on value creation (Contigiani, 2018). However, this particular finding is subject to several limitations, and we recommend further research on the topic.

Gans, Stern & Wu (2019) state that uncertainty is both related to the relative costs and benefits of a given strategy, but also the intrinsic value of the idea itself. This uncertainty is reflected in their notion of *noisy learning* - that commitment-free learning can only generate noisy estimates of the value of an idea and a given strategic trajectory (Gans, Stern & Wu, 2019).

5.2 Synthesis of findings

The literature on the formation and development of entrepreneurial strategy is still quite young. In this thesis, we have highlighted several of the core concepts of the field in an empirical setting by examining five case companies who have undergone a significant strategic change; a pivot. Below we address our initial research questions with findings from our analysis.

Answer to RQ 1 - How do entrepreneurs engage in experimentation during strategic processes, and how does this experimentation affect the strategy process?

The analysis reveals that entrepreneurs engage in experimentation within two main categories - market experimentation and technology experimentation. In both categories, the scope of the experiment can vary greatly, and it is this scope that defines the cost of the experiment and the degree to which the entire strategy process is affected.

Market experimentation activities include conducting customer interviews and workshops, releasing new features or functionalities, releasing early versions or prototypes or conducting sales before the product is even finished. While showing an early prototype in order to obtain feedback is associated with relatively low costs, selling a product before it is finished creates both expectations and commitments to a specific strategic trajectory, making the cost of experimentation high. Market experimentation tends to affect the process of strategic change by creating commitments to stakeholders and shaping product development activities along one path.

Likewise, product experimentation activities are those that explore different potential applications for a given technology. While this is often done in parallel with market experimentation in order to obtain feedback, it can also be an internal activity that allows the founding team to learn more about the technology while exploring different strategic opportunities. Product experimentation tends to affect strategic processes by expanding the possible set of strategies, but can also increase path dependency to a given strategic trajectory by incurring product development costs.

Answer to RQ 2 - How does the cost of experimentation and commitments affect strategic processes in startup ventures?

We have identified four different types of costs related to experimentation in entrepreneurial firms; intrinsic cost, product development cost, appropriability, and stakeholder commitments. These costs affect strategic processes in different ways. Intrinsic cost and product development cost spend resources and capabilities that ultimately forecloses other strategic alternatives.

Appropriability increases the risk of imitation and represents a significant barrier to experimentation where FIP is considered essential to protect technological innovation. Stakeholder commitments create path dependency to a given strategic trajectory by creating expectations and relationships which may negatively affect the firm in the future if they are not followed up.

Our findings indicate that when entrepreneurial firms engage in experimentation, entrepreneurs need to consider the complementarities of these costs as a total rather than any individual cost by itself.

6. Discussion

The purpose of this thesis has been to *investigate the role of experimentation and commitment in strategic processes for startup ventures*. In Chapter four and five, we presented our findings and analysis based on the process study of five startup ventures who have conducted a pivot. In this chapter, the authors offer their perspective on these findings, with a particular focus on the process of experimentation and the different types of costs associated with it. We will end the chapter by providing recommendations for further research and some practical advice for the practitioner of entrepreneurship.

6.1 Experimentation Cycles

Despite the apparent importance in initial strategy formation, as well as the increasing influence of methods developed by practitioners, such as the Lean Startup Approach (Ries, 2011; Blank & Dorf, 2012), experimentation in entrepreneurial firms has received relatively little attention in the literature. While some scholars consider experimentation to be a cornerstone of entrepreneurship (Kerr, Nanda & Rhodes-Kropf, 2014), only recently have empirical studies begun to explore this concept (Contigiani, 2018; Ching, Gans & Stern, 2018). In Figure 16 in Chapter five of this thesis, we presented a novel framework for experimentation cycles in startup ventures based on our research. The existing literature on entrepreneurial experimentation tends to abstract away from the opportunity costs and strategic commitments that are inherent to the process of experimentation (Gans, Stern & Wu, 2019). To address this, we argue that the novel framework seen in Figure 16 can be applied to the formation and development of strategy in entrepreneurial firms along the dimensions of experimentation, commitment, and feedback activities. We argue that in order to better understand the actual cost of experimentation in startup ventures, both researchers and practitioners of entrepreneurship needs an integrated framework that accounts for the costs and commitments of experimentation. We believe that this is the first step towards a more holistic approach to experimentation in entrepreneurship. Specifically, the framework addresses one of the main criticisms of the popular Lean Startup Approaches (LSAs) - that they

fail to account for the cost of experimentation and commitments created by the process of experimentation.

Based on our analysis of the case firms, we found that experimentation was most effective where there was a high degree of market uncertainty, such the case was for Workforce and Speaktacular. This is in line with existing literature of Contigiani (2018) and by extension strengthens the arguments of Gans, Stern & Wu (2019), who state that commitment-free learning only generates ‘noisy estimates’ of the value of an idea. Increased uncertainty implies more ‘noise,’ and following this logic, startup ventures facing high market uncertainty are those who benefit the most from experimentation. Considering that most startup ventures face significant resource constraints (Gans, Stern & Wu, 2016), we argue that experimentation needs to be framed as an active choice within the broader context of their strategy. Our findings reveal that in core decisions, such as the choice of customer segment, there is a significant risk of commitment, such as the case for HealthPedal, forcing the startup venture down a path without having had the opportunity to learn more about other strategies as well as the value of the underlying idea itself.

While outside the scope of this thesis, we observe that the principles of effectuation are valid for many of the case firms. In four of the five cases, they were founded based on the existing network, experience, and skill-sets of the founders, the exception being Speaktacular, which is a university spin-off case. At the same time, it should be emphasized that WordMash, one of the merged companies, was founded based on existing experience and skill set of the founders. An important note is that entrepreneurs usually practice a mixture of effectual and causal processes during the venture creation processes (Sarasvathy, 2009; Sarasvathy & Dew, 2008; Reymen et al., 2015). This is in line with our findings, where it can be seen that startup ventures commit to strategic trajectories without following the effectual mindset slavishly because of biases, overarching goals, and path dependency that the founders have gained a priori to the strategic processes.

6.2 Cost of Experimentation

The cost of running product experiments play a significant role in entrepreneurship, and recent technological development has dramatically lowered these costs (Kerr, Nanda, Rhodes-Kropf, 2014). This is particularly evident in industries that have leveraged trends like open-source software and cloud-computing (Palmer, 2012), and it is often software startup ventures which are most commonly associated with experimentation. However, advances in additive manufacturing, CAD-software, and advanced computer modeling have drastically lowered the cost of experimentation for hardware startup ventures as well (Sahlman et al., 2012). According to Kerr, Nanda, and Rhodes-Kropf (2014), the ability within an industry and the cost of experimentation has a significant influence on the degree of experimentation we see in the early stages of a

startup venture. Where there are very long time-frames (treatments for cancer) or very high costs (renewable energy production), there is very little market experimentation (Fernandez, Stein & Lo, 2012). Our findings support this, albeit on a small sample of startup ventures.

While much of the existing literature tends to focus on the cost of product development and distribution as the cost of experimentation (Kerr, Nanda & Rhodes-Kropf, 2014), these are only one aspect which define both the impact and the degree of experimentation. We identify four different costs related to experimentation in entrepreneurial firms; *intrinsic cost*, *product development cost*, *appropriability cost*, and *stakeholder commitments*. We argue that the actual cost of experimentation is a function of these four costs, extending the definition of the cost of experimentation in the current literature, and laying the foundation for further research on the topic along these dimensions. While all startup ventures are subject to these four experimentation costs, differences in industry, political, and environmental factors will determine the degree to which these costs influence experimentation activities.

Having defined these costs lays the foundation for further research on the topic. For instance, our small sample of case firms indicate that conducting market experimentation with services has a higher intrinsic cost than doing so with products. This is because the scalability of products often is higher than that of services. One example is InfluMarket, where the team invested heavily with internal resources to execute the experiment testing a full-service campaign offering. When it comes to product development costs, our findings support that software startup ventures have lower product development costs than hardware startup ventures, and even making significant changes to the product is possible at relatively low cost. We argue that appropriability costs are usually higher for software startup ventures since FIP is traditionally more challenging to obtain for software (Contigiani, 2018). We also argue that the appropriability cost is high for products with a high degree of innovation, since a too early release to market can diminish the chances of getting FIP, as shown by Funmotor. It is also important to note that these are broad generalizations that apply in varying degrees for specific innovations and ventures.

Stakeholder commitments represent a unique cost in terms of experimentation because it does not necessarily have a “negative” impact on the startup venture. It can also mean an expansion in available resources/means and does also include commitments created by the entrepreneurs. Their focus, goals, and motivation are closely related to the commitments of the whole startup venture. Externally, on the other hand, it can be argued that there is a clear difference between the impact of stakeholder commitments in B2B and B2C. In B2B, stakeholder commitment can often mean an expansion of resources and therefore help the startup venture move forth, while stakeholder commitment in B2C creates a reputation among the customer segment, which can be very risky, as explored by Hampel, Tracey, and Weber (2019). It is important to note that

stakeholder commitments can have a negative impact, since it creates expectations for what the startup venture develops, creating path dependency, as can be seen in the case of HealthPedal.

Our findings also indicate that the entrepreneurs can benefit from considering the total risks and benefits of engaging in experimentation in their environment when exploring a new idea. Take Workforce as an example. Both founders highlight the importance of the learning created by conducting market experimentation, but it did come at a cost. Both founders spent a significant amount of time conducting interviews and workshops, and following up these customers, representing the intrinsic cost of experimentation. These workshops also created significant stakeholder commitments by creating expectations and relationships with said customers. They also incurred a product development cost related to developing prototypes, which were eventually scrapped. Lastly, both founders pointed out that they avoided follow-up meetings with specific customers working in the same domain, fearing the risk of imitation, representing the cost of appropriability. In the case of Workforce - the outcome of the experimentation was clearly worth the sum of these costs. For others, it might not be.

By actively considering these costs, entrepreneurs can avoid the extremes of both rigid planning and unrestrained experimentation (Collis, 2016). On the level of society, this has implications for policy. Creating an environment which is conducive to experimentation can create more innovation (Kerr, Nanda & Rhodes-Kropf, 2014). Some evidence has begun to emerge on this topic, mainly that weak intellectual property environments are less conducive to experimentation (Contigiani, 2018). This is an area ripe for further research, which is only beginning to be explored.

6.3 Entrepreneurial strategy in practice and criticism of existing frameworks

The work of Gans, Stern & Wu (2016) has formed the basis for much of the theoretical framework of this thesis, and while we find support for their strategy framework in our analysis, we offer constructive criticism on the proposed implications for the practice of entrepreneurship.

Gans, Stern & Wu's (2016) main implication for practice is that entrepreneurs should carefully consider different approaches to the commercialization of an idea by exploring multiple paths along the dimensions of execution versus control and competition versus collaboration (Gans, Stern & Wu, 2016; 2019). This is supported by some empirical evidence such as Gruber, McMillan & Thompson (2008), who find that there is a positive relationship between firm performance and the number of market opportunities identified prior to market entry. However, these findings are based on data from VC-backed companies, which most startup ventures are not. Also, these results are based on small sample size and only two years of data. In an opposing view, Lange et al. (2009) find no difference in firm performance between firms launched with or

without a written business plan or strategy document, based on a study of 457 startup ventures. While this study, in no way, describes the degree to which multiple market opportunities were identified, we assume that the process of writing a full business plan also involves market search activities.

In other words, the literature doesn't provide any clear answers to whether start-ups need strategic frameworks or the value of considering multiple approaches to commercialization. Among practitioners, the Lean Startup-movement has become a dominant philosophy in the Silicon Valley culture and is especially espoused by software and technology firms. However, technology and software firms only make up 3 % of all startup ventures (Schramm, 2018), begging the question - how applicable is this view for other entrepreneurs? This particular view of strategy embraces experimentation in order to learn and adapt to highly ambiguous environments as the startup venture grows and evolves. Supporters of this view dismiss formal models and frameworks for entrepreneurial strategy as linear thinking with little practical use (Schramm, 2018). Schramm's (2018) main criticism of Gans, Scott & Stern (2018) is that business plans and strategic frameworks have no impact on the success of the startup venture, are readily forgotten once they are written, and that entrepreneurs mainly learn and adapt through trial and error. In contrast, Gans, Scott, and Stern (2018) argue that Lean Startup Approaches are flawed in two ways. First, it lacks a framework, thus failing to consider strategy as a whole, secondly it fails to account for the cost of experimentation, as well as the commitments created along the way.

We argue that there is a middle road. Frameworks and models are not roadmaps to be precisely followed, but their utility lies in their ability to help entrepreneurs and founding teams make better, bigger-picture decisions on their strategic trajectory, while also staying flexible to a profoundly changing environment. Collis (2016) summarized this succinctly; "Strategy without entrepreneurship is central planning. Entrepreneurship without strategy leads to chaos." This is supported by literature on effectuation, which shows that entrepreneurs do use a mix of causal and effectual processes (Sarasvathy, 2009; Sarasvathy & Dew, 2008; Reymen et al., 2015). We argue that for startup ventures who face high costs of experimentation, there is increased utility in conducting commitment-free learning in order to evaluate and foreclose some strategic options. Our findings show some support for this. As an example, two of the case firms, HealthPedal and Funmotor pivoted customer segment. HealthPedal was heavily investing in their first choice of customer segment, while Funmotor kept their customer commitments tentative until they had learned more about other opportunities in other segments. HealthPedal ultimately pivoted away from specialized clinics and towards commercial gyms and consumers. It could be argued that this learning could have been achieved through other, less costly means, for example, by embracing the inducement effect and therefore have experimented further. For both cases, the founders highlighted how much they learned about their ideas and markets as time went on, criticizing their early approaches as infeasible and naive. Interestingly, Workforce emphasized

that this naivety was beneficial for their initial strategy, as well as the team's motivation, explaining that if they had the knowledge they currently have about the competitive landscape, they would never have bothered even to start the startup venture.

While the utility of such frameworks is subject to much debate, the findings in this thesis indeed find support for some of the main principles of entrepreneurial strategy as presented by Gans, Stern & Wu (2019) and Gans, Scott & Stern (2018). The tension between experimentation and commitment is one of the main principles that shape entrepreneurial strategy. Startup ventures carefully need to balance experimentation activities that will allow them to learn more about the value of both their strategy and the underlying idea with the commitments created by the process itself. This is evident across all five cases, to varying degrees. In the case of Workforce, market experimentation started very early and allowed the founding team to learn a lot about the pains in the industry, the willingness to pay and desired functionalities even before they had a functioning product. However, even though the cost of experimentation was relatively low compared to the other cases, the very process of this learning created external stakeholders and commitments that would ultimately shape their strategic trajectory.

The authors also want to highlight that even though the framework proposed by Gans, Stern & Wu (2016) is centered around initial strategy formation, the findings in this study support its relevance in the process of strategic change as well. The axioms that are defining the scope of entrepreneurial strategy outlined by Gans, Stern & Wu (2016), *Freedom of choice*, *Resource constraints*, *Uncertainty* and *Learning by Commitment*, are all present in all of the cases, though to a lesser extent than around initial strategy formation. The findings in this study also support the principles outlined by Gans, Stern & Wu (2016). First, path dependency in entrepreneurial choice is evident in all cases. Further, our findings also indicate that complementarities among core choices exist, indicating that the sum of the choices is more important than each individual choice. This is observed in all cases, but can be most clearly seen in the case of HealthPedal where a pivot in customer segment made them make major choices regarding technology and changed the competitive landscape and identity of the company.

6.4 Strategy research and the lens of experimentation

When considering initial strategy formation, there are essentially two competing views, each grounded in a different philosophical branch. The analytical, prescriptive schools of thought are rooted in Descartes and notion of Cartesian doubt, embracing formal models, deconstructing strategy into smaller units to be analyzed, embracing a logic of cause and effect. The descriptive schools of thought, on the other hand, are rooted in phenomenology as espoused by philosophers such as Heidegger and Hegel. At the core of phenomenology, people learn about the world through their experiences, creating new data, and building up an understanding of their world as they proceed (Schramm, 2018). Sarasvathy (2001) introduced the theory of effectuation in order

to distinguish between these views, arguing that effectuation is a cornerstone of entrepreneurship, representing a distinct logic that applies to decisions under uncertainty that can not be resolved through causal logic (Sarasvathy 2001; 2009).

While these are often presented as fundamentally opposing views, we argue that strategy as a concept encompasses both, but in different manners. There are aspects of the strategy that can be formalized and analyzed into general frameworks, but it is impossible to plan for uncertainty. We argue that in entrepreneurial strategy, in particular, there is a need to align the analytical view of the prescriptive schools, and the emergent strategy approach of the descriptive schools. By viewing entrepreneurial strategy through the lens of experimentation, we argue that it is possible to integrate these views by framing strategy as an iterative process where the original strategy is revised through a process of experimentation and learning. We argue that there is both a deliberate element and an emergent aspect to entrepreneurial strategy. The deliberate element can consist of but is not limited to factors such as the founder's vision, the startup venture's internal strengths, capabilities, and opportunities. The emergent aspect consists of the deliberate and independent decisions to experiment within the scope of the deliberate strategy, which is in turn revised by the information uncovered by experimentation, and after that potentially turned into a deliberate strategy. We believe that future research needs to reflect the inherent complexity of strategy formation and development. In this thesis, we have conducted a process study in order to examine how strategy developed and evolved through significant strategic processes. We find that this process is highly complex and is shaped by a myriad of interconnected events, activities, and decisions, both internal and external.

7. Conclusion

The purpose of this thesis has been to investigate the role of experimentation and commitment in strategic processes in startup ventures. We have examined startup ventures that have gone through strategic processes, following each case through the initial strategy formation and a significant strategic change - a pivot. By conducting a multiple-case study of five startup ventures, we have identified key events, activities, and choices related to the dimensions of experimentation and commitment and how these have affected the strategic process. s.

In answer to our first research question, we observed a sequence across all cases which describes how entrepreneurs engage in experimentation. The experimentation cycles (Figure 16) describes how experimentation is conducted to gain feedback, allowing the entrepreneurs to gain information on a strategic alternative. The entrepreneurs contextually interpret this feedback. This, in turns, leads to a choice for the entrepreneur. If the feedback gained from the experiment allows them to update the value of a particular alternative, they can increase the commitment to this alternative. However, feedback gained from experimentation can also identify new strategic alternatives, causing further experimentation. This cycle continues until the entrepreneurs have enough information to commit to a particular strategic trajectory or until path dependency takes due to the costs and commitments created by the process of experimentation. Our findings indicate that entrepreneurs engage in experimentation for a variety of reasons; a desire to learn more about the market, internal discussions and disagreements, low traction, or mentoring from professionals all triggered experimentation activities. However, the purpose of the experimentation across cases was primarily in order to obtain feedback, allowing them to adapt and improve product-market fit before market entry. These findings are in line with the current literature on entrepreneurial strategy, particularly Gans, Stern & Wu (2019) and Contigiani (2018). We build on this work, and discuss several directions for future work that can refine the tensions between commitment and experimentation, as well as appropriability and learning, by incorporating them into an integrated framework.

We have also examined how experimentation affected startup ventures' strategic processes, which was defined by the commitments that followed the experimentation, the cost incurred by the experimentation, and the learning and feedback gained from it. We contribute to the existing literature on the cost of experimentation by extending the definition of cost, identifying four explicit types of costs related to experimentation. These are intrinsic cost, product development cost, appropriability cost, and stakeholder commitments. How these affect the experimentation activities of a startup venture varies based on several factors; industry context, degree of innovation, customer segment, and type of product, among others. In answer to our second research question, all of these costs are present when experimenting, and a combination of these will be the actual experienced cost of experimenting. While existing literature tends to focus on

one of these aspects, we argue that research on experimentation in entrepreneurship needs to reflect the total cost, as well as the complementarities that may exist between them. Gans, Stern, and Wu (2019) emphasize that commitment-free learning should be strived for whenever possible. The authors argue that although commitment-free learning is possible, this is also associated with an intrinsic cost. Thus, entrepreneurs need to consider the opportunity cost. Further, our findings indicate that experimentation is most efficient when conducted early in the history of the startup venture, as adaptation costs are generally low. This is in line with current literature on the topic (Contigiani, 2018).

Prescriptive views of strategy tend to view uncertainty as risk, which in turn can be managed by analysis and planning. Descriptive views tend to view uncertainty as fundamental, and entrepreneurs need to resolve this uncertainty through experiential means. For the case-companies examined in this thesis, strategy emerges and evolves. While prescriptive views are flawed in describing how entrepreneurs conduct strategic processes (Aldrich, 2001), descriptive views struggle in describing the impact and outcome of specific variables such as founder background and expertise. Theories regarding entrepreneurial strategy need to align these views, embracing both the practice of entrepreneurial strategy and theory that can describe it. This is consistent with the empirical findings, which shows that entrepreneurs do use a mix of causal and effectual logic in decision-making processes (Sarasvathy & Dew, 2008; Reymen et al., 2015)

Lastly, we contribute to the literature on entrepreneurial strategy by utilizing the framework developed by Gans, Stern & Wu (2016). We find strong support for the core principles of the framework, highlighting the tension between freedom and constraint in our findings. We also find strong support for the tension between experimentation and commitment through our analysis of the case companies. In Section 7.3 we offer some criticism of the framework developed by Gans, Stern & Wu (2016), highlighting the lack of empirical studies that make the case for entrepreneurial firms to adopt a strategic framework. Our findings present several opportunities for future research. One possible direction is to build examine our novel framework, the experimentation cycle, refining it by examining how different types of experimentation and feedback affect start ventures strategy, or seeing how it applies to industry-specific contexts. Software in particular would be interesting due to the low perceived cost of experimentation and prior empirical evidence (Contigiani, 2018). Another possible direction would be to examine the different costs of experimentation, investigating how economic, political and formal intellectual property environments affect the cost and degree of experimentation within that environment. Lastly, we recommend examining complementarities between the four costs of experimentation within different industries.

7.1 Implications for Practice

We have uncovered several implications for the practice of entrepreneurship by examining five case companies who have undergone a pivot. First, our findings show that there is significant path dependency in entrepreneurial choice, meaning that entrepreneurs should consider multiple paths to commercialization carefully before engaging in experimentation. Some may find frameworks such as the one presented by Gans, Stern & Wu (2016) to be useful to structure their thinking around these paths. Secondly, we find that the cost of experimentation can be complex, meaning that entrepreneurs should weigh the potential benefits of learning with the total cost of experimentation for their innovation. We identify four types of cost that the entrepreneur should actively consider when choosing to engage in experimentation.

Further, our findings indicate that there are complementarities within these costs, implying that the sum may be greater than each of its components. As an example, a manager of startup venture in a weak intellectual property environment and relatively low product development costs faces a significant imitation risk, if they were to disclose an early version of their product to the market. Lastly, entrepreneurs should frame positive feedback on a specific strategic alternative as a validation of the underlying idea, increasing the possible set of alternatives. Rather than immediate commitment in response to positive feedback, the entrepreneurs should consider additional search to identify the best alternative among several possible paths for commercialization.

8. Limitations

This thesis contributes insights to the field of experimentation and commitment within strategic processes for startup ventures. Therefore, the proposed conceptual framework, the Experimentation Cycle, might not be applicable for larger established firms. These firms often possess resources to pursue multiple viable strategic trajectories at once but lack the freedom of a startup venture to conduct a strategic turnaround due to strong path dependency. The framework might also not apply to startup ventures where the premises of entrepreneurial strategy is not present. An example could be that a carpenter who has worked in the industry for a long time decide to start a company. This company might satisfy the conditions of having the freedom and being resource constrained, but due to years of experience in the industry the uncertainty is very low, and hence experimentation and the cycle of learning and commitment will be irrelevant. At the same time, it could be argued that the experience from the industry constitutes a significant path dependency, and therefore, the degree of freedom is low.

Further, the empirical findings should be considered guidelines rather than an in-depth study. The empirical data made it possible to develop a conceptual framework, building on the strategic process as derived from Gans, Stern, and Wu's (2016) framework. However, this framework is created inductively and has yet to be tested deductively, where it is applied to startup ventures, and the generalizability of the framework is evaluated.

9. References

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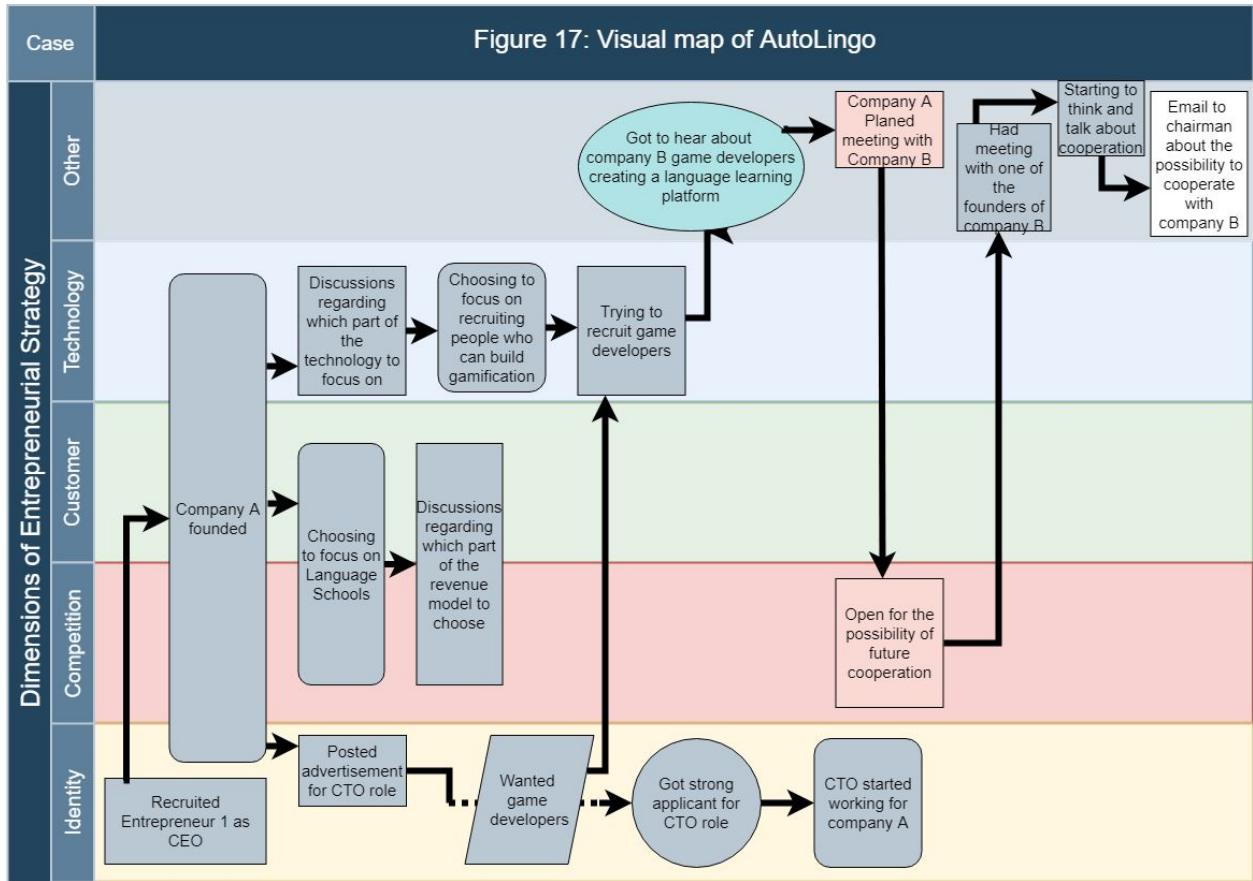
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Appendix

Appendix 1: Core choices in entrepreneurial strategy

Customer	Technology
<p>The choice of customer sets the startup onto a trajectory for a specific vertical, defining, in part, its value proposition, product design, and price. Entrepreneurial strategy reframes this as a choice of which market adoption curve the startup chooses to participate in, rather than searching for an optimal beachhead market. This is based on the wide body of literature on innovation diffusion (Rogers, 2010) and market adoption S-curves (Moore, 1991).</p>	<p>Inspired by the work of March (1991), the choice of technology is framed as a balancing act between exploration and exploitation that the entrepreneur needs to consider. This is founded in the belief that technology is dynamic and needs to undergo significant experimentation to evolve with the market (Utterback & Abernathy, 1975), which led to the development of Foster's (1988) technology S-curve. Start-up ventures face the initial choice of which technology S-curve they dedicate themselves to.</p>
Competition	Identity
<p>This area is well-treated by literature on competitive strategy, particularly the work of Porter (1985; 1996), which highlights the importance of the dynamic forces that shape the firm's competitive environment. Entrepreneurial strategy reframes the choice of competition as the terms on which the startup wants to compete, rather than an environmental fact. This choice is delineated via two dimensions. The dimension of collaboration and competition concerns the choice of with whom to compete, and while founding teams cannot choose to <i>not</i> compete - they need to choose a route to commercialization that involves either direct competition with established players or cooperating with them and integrating into an established value chain (Teece, 1986). The dimension of execution and control concerns the choice of <i>how</i> to compete. While <i>execution</i> is a means of rapidly developing, commercializing, building capabilities and gaining market shares in order to compete, <i>control</i> is about investing in securing formal intellectual property protection and protecting their capabilities, building bargaining power and excluding others from direct competition.</p>	<p>The choice of firm identity is crucial for establishing trust, reputation and perceived authenticity (Frake, 2016), and research indicates that once identity begins to form, it is difficult to alter or migrate to an alternative identity (Tripsas, 2009). Gans, Stern, and Wu (2016) take the stance that there are multiple viable alternatives which leverage different visions and capabilities for any given startup, meaning that these choices shape the trajectory of the venture, and should be considered carefully. Founder purpose defines the mission and scope of the startup and is in part based on the background and values of the founders. Internal capabilities are shaped by choices such as early hires, organizational design, and capital investment. External positioning is how the startup chooses to communicate its position in a given market and contributes to shaping and coordinating priorities within the firm and its reputation (Porter, 1985). Ecosystem is related to the geographic location of the startup and access to resources such as talent, network, customers, and more.</p>

Appendix 2: Visual Map of AutoLingo



Appendix 3: Visual Map of WordMash

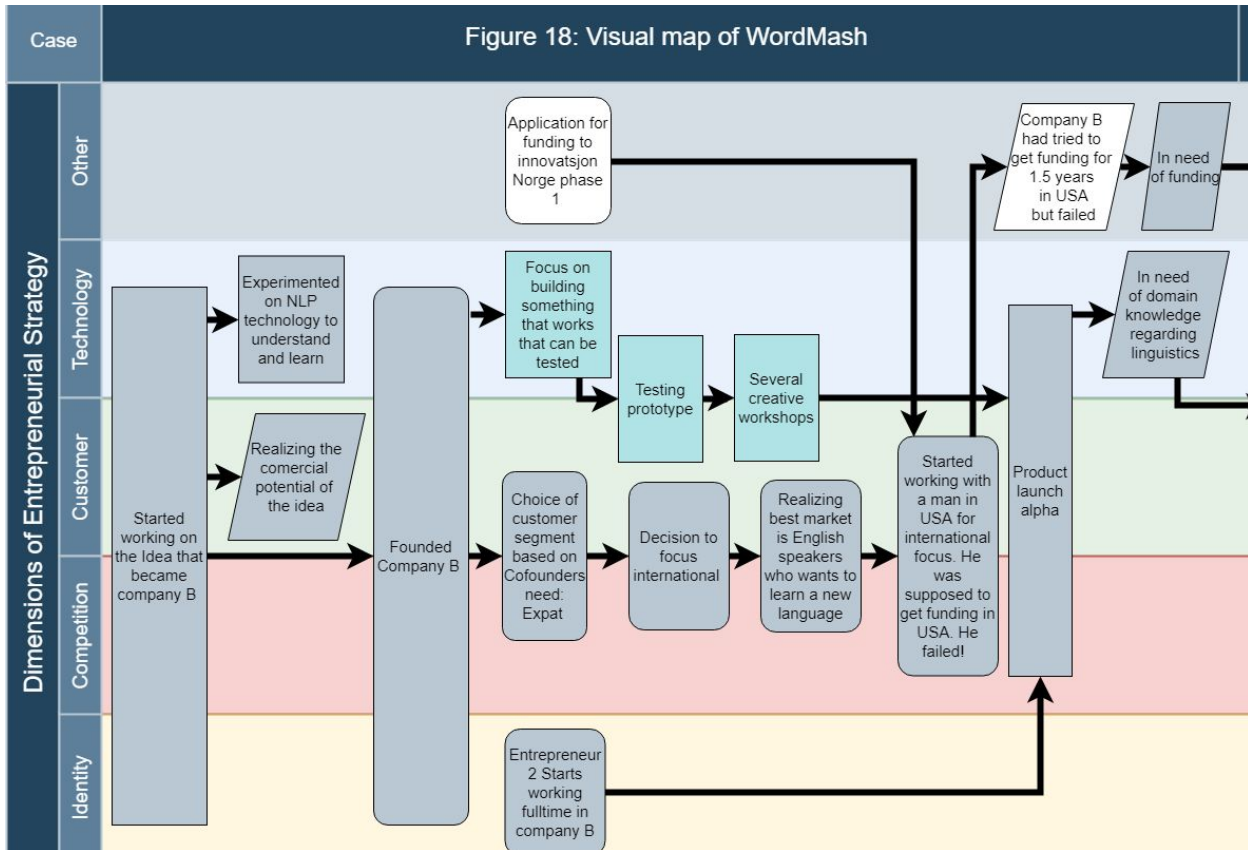


Figure 18: Visual map of WordMash

