UNIVERSIDADE DE SÃO PAULO
FACULDADE DE ECONOMIA, ADMINISTRAÇÃO, CONTABILIDADE E ATUÁRIA
DEPARTAMENTO DE ADMINISTRAÇÃO
PROGRAMA DE PÓS-GRADUAÇÃO EM ADMINISTRAÇÃO

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Pivoting in Startups: A Judgment Based Approach
O Pivotamento Em Startups: Uma Abordagem Baseada No Julgamento

São Paulo
2022

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Tese apresentada ao Programa de Pós-Graduação em Administração da Faculdade de Economia, Administração, Contabilidade e Atuária da Universidade de São Paulo, como parte dos requisitos para obtenção do título de Doutor em Ciências.

Área de Concentração: Administração.

Orientador: Prof. Dr. Leonardo Augusto de Vasconcelos Gomes

Original Version

São Paulo

2022

Catalogação na Publicação (CIP)
Ficha Catalográfica com dados inseridos pelo autor

Flechas Chaparro, Ximena Alejandra.
Pivoting in Startups: A Judgment Based Approach / Ximena Alejandra Flechas Chaparro. - São Paulo, 2022.
228 p.

Tese (Doutorado) - Universidade de São Paulo, 2022.
Orientador: Prof. Dr. Leonardo Augusto de Vasconcelos Gomes.

1. Pivotamento. 2. Tomada de decisão. 3. Startup. 4. Julgamento empreendedor. 5. Falha. I. Universidade de São Paulo. Faculdade de Economia, Administração e Contabilidade. II. Título.

Nome: Flechas Chaparro, Ximena Alejandra

Título: Pivoting in Startups: A Judgment Based Approach

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Aprovado em:

Banca Examinadora

Prof.(a) Dr.(a) _____
Instituição: _____
Julgamento: _____

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Prof.(a) Dr.(a) _____
Instituição: _____
Julgamento: _____

ACKNOWLEDGEMENTS

First, I would like to thank my advisor, Leonardo Gomes, for all his guidance and mentorship throughout this research. His advising style motivated me to strive to achieve the best possible results. He gave me the independence to explore problems and different bodies of literature and always took the time to work through questions that came up along the way with me. I would also like to thank Rafaela, Francisca, Matheus, Filipe, and Lucas—colleagues oriented by Leonardo—for all their support and companionship throughout this 'uncertain' journey. My gratitude also goes to all the friends I've made at FEA/USP. It was the people I spent time with that made my FEA experience as unforgettable and life-changing as it was. Of course, I am also deeply grateful to my research group *Bridge*. In this group, I became a researcher. I learned a lot from interviews, studies, workshops, events, and many interactions that enhanced my vision and skills in research and practice. In this group, I had the opportunity to meet wonderful people to whom I am also very grateful. Aline, Dany, Ana, Borini, Lorenna, Guilherme, Fábio, the list is endless. Additionally, infinite thanks to all who participated in the interviews and with whom I was able to know their story. All this work would not exist without the participation of the entrepreneurs. This study is definitely due to them. Lastly, I would like to thank my family and friends, essentially my mother, whose immense support throughout my life has allowed me to be where I am today. Special thanks, in particular, to my beloved husband Felipe; without his support, the result would not be the same.

Thank you, everyone, for all your contributions to this research.

Concorezzo, IT, June 23, 2022.

RESUMO

Flechas Chaparro, X. A. (2022). *O pivotamento em startups: uma abordagem baseada no julgamento* (Tese de Doutorado). Faculdade de Economia, Administração, Contabilidade e Atuária, Universidade de São Paulo, São Paulo.

O tema desta tese é o pivotamento em startups a partir de uma abordagem de julgamento empreendedor. Por pivotamento (ou decisão de pivotamento), nós nos referimos a uma decisão estratégica tomada após uma falha (ou a identificação de uma falha potencial) de um ou mais elementos do modelo de negócios atual, que potencialmente ameaça a base de recursos da startup. Essa decisão pode alterar o curso de ação, reconfigurar a base de recursos e modificar a crença de oportunidade e um ou mais elementos do modelo de negócios. Apesar do pivotamento ser amplamente reconhecido entre os empreendedores como uma das decisões mais cruciais, tem sido pouco estudado em pesquisas acadêmicas. Há cinco aspectos que precisam ser abordados. Em primeiro lugar, ainda não há uma definição clara do que é pivotamento e como ele difere de outras decisões estratégicas. Segundo, não foram examinados quais atributos e vieses cognitivo-afetivos podem afetar o julgamento durante o pivotamento. Terceiro, ainda não é claro como os elementos presentes no julgamento desta decisão (falhas, crenças, ações) se entrelaçam e resultam em pivotamentos. Em quarto lugar, há uma falta de compreensão de por que alguns empreendedores decidem pivotar, enquanto outros persistem independentemente do advento de falhas. Finalmente, ainda não está claro se os pivotamentos ocorrem de forma diferente e como eles diferem uns dos outros. Estas lacunas levaram à formulação da seguinte questão de pesquisa: “Como os empreendedores pivotam suas startups?” Para abordar essa questão, foi adotada uma rica abordagem metodológica que combina revisões sistemáticas de literatura e uma pesquisa qualitativa empírica seguindo uma abordagem processual baseada em estudos de caso. Um total de 39 decisões de pivotamento ocorridas em 24 startups (5 colombianas, 18 brasileiras e 1 inglesa) foram analisadas. A partir das revisões sistemáticas de literatura, foram identificados os principais aspectos cognitivos envolvidos no pivotamento, as distintas correntes de estudo sobre esta decisão, e foi elaborada uma definição do pivotamento em startups. Com base nos estudos empíricos, desenvolvemos um modelo de processo que mostra como uma série de eventos que se inter-relacionam resultam em pivotamentos. Este estudo também revelou que a interação entre a percepção da falha e a atribuição da falha desempenha um papel importante para determinar se os empreendedores irão atualizar suas crenças e pivotar, ou reforçar suas crenças e persistir. Adicionalmente, com

base nas análises, foram identificados quatro eventos críticos que explicam as decisões de pivotamento: resposta ativa, abandono da crença inicial, *sensemaking* retrospectivo e *sensemaking* prospectivo. Por fim, foram identificadas três abordagens de pivotamento: *break-point*, paralela e adaptativa. Os resultados contribuem para a literatura de julgamento empreendedor, fornecendo uma melhor compreensão da influência da falha (percepções e atribuições) nas crenças dos empreendedores e ações futuras. Adicionalmente, foram identificadas implicações teóricas e práticas e oportunidades para novas pesquisas. Esperamos que as descobertas deste estudo aumentem a conscientização sobre o quão desafiadoras podem ser as decisões de pivotamento e que possa servir como um complemento para empreendedores, mentores, professores e outros envolvidos para orientar melhor tais decisões.

Palavras-chave: Pivotamento. Tomada de decisão. Startup. Julgamento empreendedor. Falha.

ABSTRACT

Flechas Chaparro, X. A. (2022). *Pivoting in Startups: A Judgment Based Approach* (Doctoral Thesis). Faculdade de Economia, Administração, Contabilidade e Atuária, Universidade de São Paulo, São Paulo.

The theme of this thesis is pivoting in startups from an entrepreneurial judgment approach. By pivoting (or pivot decision), we refer to a strategic decision made after a failure (or the identification of potential failure) of one or more elements of the current business model, which potentially threatens the startup's resource base. This decision may change the course of action, reconfigure the resource basis, and modify the opportunity belief and one or more elements of the business model. Despite the pivot being recognized among practitioners as one of the most crucial decisions during the new venture creation, this topic has scarcely been studied in academic research. There are five important aspects that remain unclear. First, there is not yet a clear definition of what pivoting is and how it differs from other strategic decisions. Second, it has not been examined which cognitive-affective attributes and biases may affect judgment during pivoting. Third, it is still unknown how the elements affecting the judgment during this decision (failures, beliefs, actions) intertwine to lead to pivots. Fourth, there is a lack of understanding of how failures relate to pivots and why some entrepreneurs decide to pivot, whilst others persist regardless of failures' emergence. Finally, it is not clear whether pivots occur differently and how they differ from each other. The identification of these gaps led to the formulation of the following research question: "How do entrepreneurs pivot their startups?" To address this question, this study adopts a rich methodological approach that combines systematic literature reviews and empirical qualitative research, following a processual approach based on case studies. A total of 39 pivot decisions were analyzed. Such decisions occurred in 24 startups: 5 Colombian, 18 Brazilian, and 1 British. The systematic literature reviews identified the main cognitive aspects involved in pivoting, the perspective streams studying this decision, and we established a refined definition for pivoting in startups. Based on the empirical studies, we developed a process model showing how a series of interrelated events results in pivots. This study also found out that the interplay between the perception of failure and attribution of failure plays a major role in determining whether the entrepreneurs will update their beliefs and pivot, or rather, will reinforce their beliefs and persist. Furthermore, based on the analyses, four events were identified to be critical in explaining pivot decisions: actuating response, abandonment of initial belief, retrospective

sensemaking, and prospective sensemaking. Finally, three major pivot approaches were identified: break-point, parallel, and adaptative. The findings contribute to the entrepreneurial judgment literature by providing a better understanding of the influence of failure (perceptions and attributions) on entrepreneurs' beliefs and further actions. Additionally, were identified theoretical and practical implications and opportunities for further research. We hope that the findings of this study will increase awareness about how challenging and resource-consuming pivot decisions can be. Moreover, we expect this study can serve as a supplement for entrepreneurs, mentors, teachers, and others involved to better guide pivot decisions.

Keywords: Pivot. Decision-making. Startups. Entrepreneurial judgment. Failure.

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LIST OF ABBREVIATIONS

B2B – Business to Business

B2C – Business to Customers

BAR – Beliefs, Actions, and Results

BM – Business Model

CAPS – Cognitive-Affective Process System

CEO – Chief Executive Officer

DOOH – Digital Out of Home

EA – Entrepreneurial Action

ERP – Enterprise Resource Planning

IT – Technology and Information

JBA – Judgment-based Approach

MVP – Minimum Viable Product

NTBF – New Technology-Based Firms

OB – Opportunity Beliefs

SLR – Literature Review

SMEs – Small and Medium Enterprises

WOS – Web of Science

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1 INTRODUCTION

"*The payoff is the learning that will come from the "failures" which will pave the way for future successes*" (Maidique & Zirger, 1985)

This chapter is divided into five sections. The first section (1.1) introduces the theme and research context. The second section (1.2) presents relevance and research gap. The third section (1.3) presents the aim of the research. The fourth section (1.4) presents the contributions. Finally, section 1.5 describes the structure of this thesis.

1.1 THEME AND RESEARCH CONTEXT

Entrepreneurship has progressively become a flourishing field of research (Davidsson & Gruenhagen, 2021; Shane & Venkataraman, 2000; Shaver, 2012). Historically, many authors have recognized the central role of entrepreneurs as drivers of innovation and enablers of economic growth (Kirzner, 1997; Schumpeter, 1934; Shane et al., 2003). For Shane and Venkataraman (2000), entrepreneurship entails the "study of sources of opportunities; the processes of discovery, evaluation, and exploitation of opportunities; and the set of individuals who discover, evaluate, and exploit them" (p. 2018). Scholars have also highlighted the unique characteristics of entrepreneurial behavior and have investigated its underlying aspects, such as actions, decisions, willingness, and beliefs (Shane et al., 2003; Shane & Venkataraman, 2000). McMullen and Shepherd (2006) refer to this behavior as entrepreneurial action (EA), defined as the set of actions resulting from judgmental decisions under uncertainty facing a "possible opportunity for profit" (McMullen & Shepherd, 2006, p. 134). The decisions and beliefs that drive the EA are constantly tested and updated as the entrepreneurial journey progresses (McMullen, 2015), especially since the entrepreneurial journey may be chaotic, unpredictable, and challenging (Korber & McNaughton, 2018; Lomberg et al., 2019).

During venture creation, entrepreneurs may be faced with failures, which in turn require them to improve their situation by exercising judgment to determine whether they should persist in their current course of action, abandon it, or redirect it (McMullen, 2015; Wood et al., 2019). However, this judgment does not come for free. There are many factors to be considered (e.g., social linkages, third-party involvement, cognitive biases, etc.). Indeed, this decision "may arguably be one of the most difficult metacognitive decisions to make, particularly since the future is uncertain" (Bae et al., 2021, p. 277).

According to several authors (e.g., Hampel et al., 2020; Fisher, 2020), the type of decision that redirects a course of action in pursuing better results is labeled as a pivot. The term "pivot" was coined by Erick Ries in a blog posted in 2009 entitled "Pivot, don't jump to a new vision" (Ries, 2009). Further, in his book The Lean Startup, Ries (2011, p. 149) proposed the first definition of the pivot as a "structured course correction designed to test a new fundamental hypothesis about the product, strategy, and engine of growth." The term pivot has been widely promoted among practitioners (Blank & Dorf, 2012; Maurya, 2012) but is different among academics (Hampel et al., 2020). Although emergent, the literature already presents increasingly divergent guidance on aspects such as what constitutes a pivot, how, when, and why entrepreneurs pivot (Chen et al., 2021; Flechas & Gomes, 2021).

Conflicting perspectives remain on whether entrepreneurs should abandon or change their actions in the face of negative feedback (Mattingly et al., 2016). On the one hand, some researchers suggest that entrepreneurs should be flexible, fearless, and change their course of action in order to align the firm to the external conditions and seize the opportunities that may arise (Blank & Dorf, 2012; Dencker et al., 2009; Ries, 2011). On the other hand, authors suggest that entrepreneurs must be predominantly committed and persevere in their strategies because they are trying to achieve legitimacy and credibility (Eesley & Wu, 2020; Meek & Williams, 2018). Being flexible and changing or, on the contrary, being persistent in the current course of action when facing difficulties is a dilemma intrinsic to the pivot discussion because, depending on the entrepreneur's behavior, the decision to pivot will be more or less plausible.

As we will show in more detail in chapter 3, consistent with previous studies (Marx and Hsu, 2015; Hampel et al., 2020), we propose a definition of pivoting (or pivot decision) as a strategic decision made after a failure (or the identification of a potential failure) of one or more elements of the current business model (BM), which potentially threatens the startup's resource base. This decision changes the course of action, reconfigures the resource basis, and may modify the opportunity belief (OB) and one or more elements of the BM. A pivot, therefore, refers to the concrete action of change that redirects the course of the startup[1]. Since a pivot decision occurs under uncertainty (Sala et al., 2022), entrepreneurs may find it difficult to determine the best strategy for a pivot—what, when, and how to pivot, and what the consequences might be.

[1] Throughout this research, we refer to a startup as a recently technology-based venture created to search for a scalable and sustainable BM, characterized by a lack of resources, rapid evolution, third-party dependency, and work under several uncertainties (Blank, 2013; Giardino et al., 2014)

Different streams of research have implicitly addressed some aspects regarding pivots and could provide interesting insights for explaining them. For instance, Ott, Eisenhardt, and Bingham (2017) discuss how entrepreneurs elaborate and pursue strategies to form their ventures. The authors explore the dichotomy between 'strategize by doing' (i.e., strategize by interacting and experimenting with the environment) and 'strategize by thinking' (i.e., strategize by creating a holistic understanding of the environment). Boddington and Kavadias (2021) argue that these types of strategizing may inform entrepreneurs' pivoting logic and the performance of this decision. Similarly, Weick (2001) and Wiltbank, Dew, Read, and Sarasvathy (2006) pointed out the relationship between the capacity to predict the future and the ability to experiment with the environment in order to determine strategies. This research stream informs the managerial approaches under uncertainty to create strategies by investing resources in a single targeted idea (being persistent) or performing multiple adjustments (pivoting) to an idea via experimentation.

Another line of inquiry is organizational change (e.g., March, 1981; Nelson & Winter, 1982; Weick, 2000) and how firms change in a dynamic environment (Bower & Christensen, 1995; Teece et al., 1997). Overall, these studies focus on explaining how changes in the environment permanently affect the activities of corporations, causing them to change their strategies to better adapt to their context (March, 1981). Scholars have also identified some central aspects to consider the change in organizations, such as routines (Teece et al., 1997), resources (Bloodgood & Morrow, 2003), identity, structure, and culture (Van De Ven & Poole, 2005). However, this body of literature has focused mainly on studying change in established companies that differ significantly from startups. For instance, mature companies have historical data and resources to implement changes in their strategies, while entrepreneurs would likely face severe resource constraints to embrace strategic changes (Kirtley & O'Mahony, 2020). Moreover, decisions in startups depend almost entirely on founders; therefore, they directly influence all the venture's decisions (Dencker et al., 2009; Haynie et al., 2012; Liñán et al., 2016). From this line of inquiry, we identified some characteristics that may be similar to pivoting; for instance, organizational change is a process of adjusting strategies that involve several elements (e.g., routines, structure, resources) and is primarily triggered by environmental changes.

A third research stream, entrepreneurial judgment and decision-making, examines important elements intrinsically related to the pivot phenomenon. Authors such as McMullen and Shepherd (2006) and Packard, Clark, and Klein (2017), have situated decision-making as one of the focal points of EA, which depends on the entrepreneurs' judgment. According to

McCann (2017, p. 596), entrepreneurial judgment "refers to the process of forming estimates of the value of future events (i.e. beliefs)" under conditions of uncertainty to determine what course of action to take. Foss et al. (2019, p. 1205) highlight that after outcomes have emerged, entrepreneurs may perceive the need to adjust their course of action: "the entrepreneur either learns, and plans to take different actions in the future, or runs out of capital and is forced to exit." Likewise, Packard et al. (2017, p. 10) argue that judgment is a continuous and dynamic process and, combined with the endogenous and exogenous factors, might lead to "redirect the venture more closely toward the desired outcome." These perspectives seem to be quite close to the pivot decision and might provide a basis for explaining pivot decisions in startups.

Last but not least, research on failure in new ventures tangentially informs several factors related to pivot decisions. The scope of this stream of research has been centered on aspects such as bankruptcy or business termination (e.g., Mcgrath, 1999; Morais-Storz et al., 2020), grief and negative emotions (e.g., Shepherd, 2003), learning from failure (e.g., Yamakawa et al., 2015), and biases from failure (e.g., Zhang & Cueto, 2017). Considering our conceptualization of pivots—in which failures or potential failures trigger pivots—failures should be central to this study. We follow the failure definition provided by Politis and Gabrielsson (2009, p. 365) and Cannon and Edmondson (2001, p. 300) as "deviation from expected and desired results." The emphasis that we raise in this research concerning the failure is due to the following situation: "When people fail at a task, they often become discouraged and give up (…). But occasionally, an individual remains optimistic and claims that despite past failures, he will succeed the next time" (Anderson and Jennings, 1980, p. 393). We observed exactly this situation in entrepreneurial settings. Literature indicates that a number of entrepreneurs all over the globe are constantly struggling with extreme circumstances that in some cases led them to failure (Artinger & Powell, 2016). At times, the failure will discourage them to continue with their ventures (i.e., they will exit), sometimes the entrepreneurs will persist within the failed course of action, and in other cases entrepreneurs will pivot.

Together, these streams of research provide several crucial elements from which pivot research can benefit. For instance, entrepreneurial logic to create strategies under uncertainty, the concepts of entrepreneurial opportunity and opportunity belief, the cognitive process of entrepreneurial judgment that enables decision-making, and the failure responses of entrepreneurs. Nevertheless, several issues require further examination and deeper analysis in order to advance the general understanding of pivot decisions. In the next section, we will present these issues.

1.2 RELEVANCE AND RESEARCH GAP

Empirical research indicates that a pivot is one of the most common and important entrepreneurial decisions (Bajwa et al., 2017; Camuffo et al., 2020; Fischer, 2020). Pivots involve irreversible commitments, unknowable outcomes, may place stakeholder networks at risk, and may compromise the firm's existence (Hampel et al., 2020; Pillai et al.,2020). However, this topic has received little attention among scholars. In this regard, McMullen (2015) argues that entrepreneurial economic theories have centered on the entrepreneurial macro-decisions (e.g., to become an entrepreneur) and their consequences, neglecting the micro-decisions that in many cases are related to "the judgment to persist, abandon, or re-direct the entrepreneurial journey" (i.e., to pivot) (McMullen, 2015, p. 653). Pettigrew et al. (2001) raised the issue of insufficient discussion on change in new ventures; they highlighted the absence of pluralism of multiple levels of analysis of contexts and actions for this field of research. Fourteen years later, Parastuty et al. (2015), in an attempt to fill this gap, made a literature review on organizational change theories that address young firms. They identified ten theories in organizational science and entrepreneurial research that have "the potential to explain the change in young firms" (p. 245). However, they conclude "that none of the analyzed theoretical conceptions explains the change of young firms in all aspects" (p. 255), even though new ventures have a substantial impact on economic growth (Hmieleski & Baron, 2009).

Popular among practitioners for more than a decade (even becoming a kind of mantra within Lean methodologies), the pivot has recently caught the attention of academics (e.g., Hampel et al., 2020; Kirtley and O'Mahony, 2020; Camuffo et al., 2020). Research in this area has highlighted the existence of different types of pivots (Sala et al., 2022), the consequences of pivots in startups' BM (Terho et al., 2015), how extremely common pivots are (firms such as Twitter, Groupon, and PayPal have pivoted) (Bajwa et al., 2017), the key factors that may influence pivots (i.e., the role of founders, sustainability of the BM, cash and financing, market conditions, business financials, and new technology) (Comberg et al., 2014), the involvement of third parties in such decisions (Hampel et al., 2020; R. McDonald & Gao, 2019), and the cognitive aspects (Grimes, 2018; Wood et al., 2019) and beliefs (Kirtley & O'Mahony, 2020) that may interfere with pivoting decisions. Regarding this last point, Grimes (2018) and Wood et al. (2019) explored how individual cognitive aspects such as psychological ownership, identity, misalignments between expectations and actual performance, and impulsiveness interfere with pivots. In addition, Kirtley and O'Mahony (2020) found that pivots occur when

entrepreneurs' prior beliefs are conflicted with new information, and thus, pivots can alter entrepreneurs' beliefs.

More recently, Boddington and Kavadias (2021) studied the type of reasoning models involved in pivot decisions. Through a longitudinal qualitative study, the authors concluded that inductive reasoning (often referred to as 'by thinking,' Ott et al., 2017) is likely most beneficial for pivots during the ideation and scaling stages of the startup. Conversely, deductive reasoning (associated with 'by doing' logic, Ott et al., 2017) is more suitable for pivots during the validation stage. Furthermore, Chen et al. (2021) found out that best-performing entrepreneurs spend more time systematically experimenting with an initial idea (and one at a time) for collecting information highly accurately before making the pivot. In other words, best-performing entrepreneurs are very cautious: only when the experiment clearly shows that the initial assumption is incorrect that the entrepreneur pivots.

These previous studies provide a very insightful background that has undoubtedly contributed greatly to our understanding of the pivot phenomenon. Nevertheless, we identified five specific aspects that remain unclear. First, we noted that the literature already presents increasingly divergent guidance on what constitutes a pivot: Whether pivot refers to a change in a firm's strategy (Brenk et al., 2019), changes in a business's direction or ideas (Axelson & Bjurström, 2019), a structured course correction designed to test new hypotheses (Shepherd and Gruber, 2020), a BM replacement (Teece, 2018) or a strategic decision between alternative courses of action (Pillai et al., 2020). Second, although scholars have already informed about the influence of several cognitive aspects on judgment and, consequently, on pivot decisions, this information is somewhat scattered, which makes it difficult to identify which cognitive-affective attributes and biases are more prevalent in pivot decisions. Third, the underlying judgmental logic of the process of pivoting: i.e., how failures, beliefs, and actions intertwine to lead to pivots, has not yet been well developed. Chen et al. (2021, p. 1) argue that there is a lack of understanding about "the factors that determine whether, when, and how often a new venture should pivot."

Fourth, even less understood is how failures relate to pivots and why some entrepreneurs decide to pivot while others opt to persist regardless of the emergence of failures. Perhaps the most noticeable gap between failures and pivots is the understanding of failures as a learning instrument that may help entrepreneurs to take remedial actions to improve the situation and thus avoid the termination of the venture. Finally, when analyzing the multiple cases of pivots studied in the literature, a latent consideration is that not all pivots occur in the same fashion. However, improving the understanding of this difference (whether entrepreneurs adopt

different approaches to pivot and how they differ from each other) is also an issue that merits further research. We argue that failure in understanding such aspects might lead to an incomplete theorization of entrepreneurial action.

The next section will present the primary aim and specific objectives that guide this research.

1.3 AIM OF RESEARCH

Considering the arguments presented above, our primary aim is to propose an alternative understanding of pivoting in startups and thus, mitigate some of the divergent aspects already present within the pivot literature. Our theorizing efforts are guided by the following research question:

How do entrepreneurs pivot their startups?

Furthermore, we set a series of specific objectives:

1. To propose a refined definition of pivoting that can contribute to the recognition of this particular decision from others
2. To identify which cognitive-affective attributes and biases may affect judgment during pivoting
3. To propose a conceptual framework that identifies the underlying judgmental logic of the process of pivoting; by bridging how failures, beliefs, and actions intertwine to lead to pivot or persist
4. To better understand the link between failures and the entrepreneurs' decisions to pivot
5. To identify whether entrepreneurs adopt different approaches to pivot and how they differ from each other

The following section will present the contributions from this doctoral thesis.

1.4 CONTRIBUTIONS OF THE THESIS

This thesis provides four contributions. First, based on the systematic literature reviews, we contribute to the nascent literature on pivoting (e.g., Boddington & Kavadias, 2021; Chen et al., 2021; Kirtley & O'Mahony, 2020) by establishing an improved conceptualization of pivoting, reviewing the perspective streams studying this decision, and

providing a starting point for developing future research on pivoting. Additionally, we enrich the literature stream that examines the cognitive characteristics associated with pivoting (Leatherbee & Katila, 2017; Yang et al., 2019) by identifying the cognitive-affective attributes (CAPS) and biases that are more prevalent in such decisions.

Second, as further detailed in chapter 6, we propose a process model that addresses the lack of understanding regarding how new ventures pivot, as pointed out by Chen et al. (2021). By integrating different visual strategies and coding analyses, we identified the core elements (events and characteristics) of the pivoting process. These core elements enabled us to unpack the judgment logic of pivoting in startups, thus contributing to scholars such as Boddington and Kavadias (2021), who investigate such issues. For instance, we found out that the interplay between the perception of failure and attribution of failure plays a major role in determining whether the entrepreneurs will update their beliefs and pivot, or rather, will reinforce their beliefs and persist. Furthermore, we identified four critical events for explaining pivot decisions: actuating response, abandonment of initial belief, retrospective sensemaking, and prospective sensemaking.

Third, we contributed to revealing how pivoting in startups differs, a concern of scholars such as Camuffo et al. (2020) and Wood et al. (2019). Specifically, we identified three major pivot approaches: break-point, parallel, and adaptative. These findings show how pivoting decisions vary from each other regarding complexity, resource involvement, and type of experimentation employed, among others. This finding allows us to explore why pivoting is difficult in some cases.

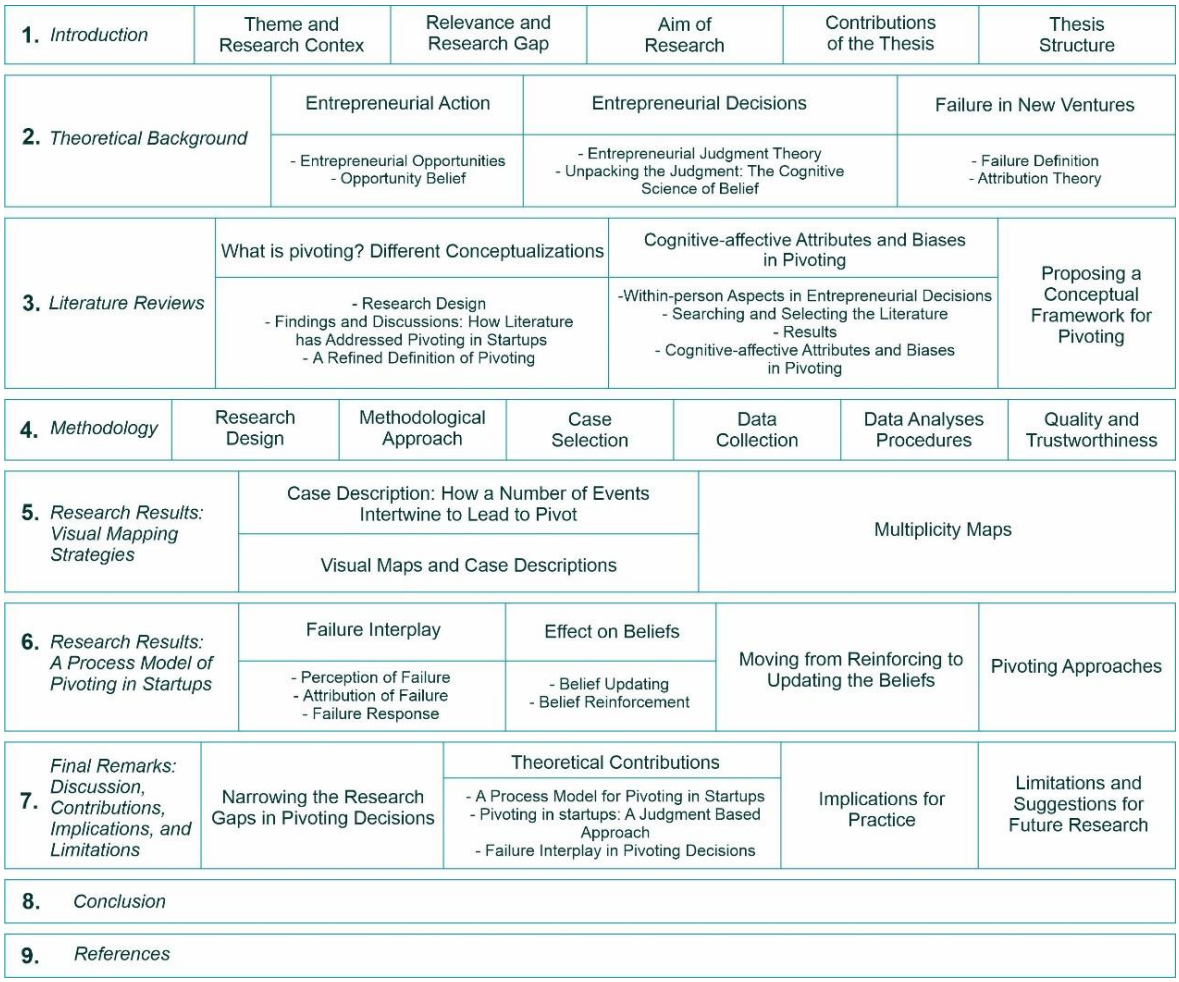
From the point of view of practical implications, we provide substantial contributions to early-stage entrepreneurs and their stakeholders. For instance, as we specify in section 7.3, our findings indicate that entrepreneurs might employ a parsimonious approach for pivoting in which each aspect of the BM is carefully evaluated, and accordingly, starting by abandoning and adjusting the elements that appear to be most inconsistent. Our study also identifies that, in some cases, pivoting can be effortful and may demand significant resources from the venture and even compromise the well-being of the entrepreneurial team. Therefore, entrepreneurs may need support during pivoting. We hope that this study can serve as a supplement for entrepreneurs, mentors, teachers, and others involved to better guide pivot decisions.

The structure of the thesis will be described in the following section.

1.5 THESIS STRUCTURE

This document is structured in nine sections, as depicted in Figure 1. Chapter 1 introduces the theme and research context, relevance and research gap, the aim of the research, contributions, and the document structure. Chapter 2 discusses the theoretical background by covering the literature on entrepreneurial action, entrepreneurial decisions, and failure in new ventures. Chapter 3 addresses the systematic literature reviews: the first one is dedicated to the conceptualization of the pivot decisions, and the second discusses the cognitive-affective attributes and biases involved in pivot decisions[2]. This Chapter is culminated by presenting our conceptual framework

Figure 1 – Thesis structure



Source: created by the author.

[2] This section resulted in the article "Cognitive-affective attributes and biases in pivot decisions" presented at the XIX Altec Congress, Lima, Peru, 2021.

Chapter 4 details the methodological procedures, describing the research design, methodological approach, case selection, data collection, data analysis procedures, and quality and trustworthiness criteria. Chapter 5 presents the research results concerning visual mapping strategies and case descriptions. Chapter 6 presents our process model of pivoting in startups and the three pivoting approaches (breakpoint, parallel, and adaptative). Chapter 7 contains the final remarks: discussion, contributions, implications for practice, and suggestions for future research. Finally, Chapter 8 presents the conclusion, and Chapter 9 presents the references.

The following chapter presents the theoretical background on which this study is based.

2 THEORETICAL BACKGROUND

This chapter examines the research field to which this thesis aims to contribute. The literature discussed in this section was deemed relevant by the researchers because it implicitly addresses fundamental concepts underlying pivoting. These concepts allowed us to establish a robust theoretical basis—grounded in research streams that have been widely discussed—that integrates multiple elements (e.g., beliefs, decisions, failures) to build our conceptual framework. It is important to note that the nascent pivot literature—developed mainly as of 2018—lacks a comprehensive theoretical framework that encompasses the different nuances of the complex pivot phenomenon. Concerning the pivot literature, we developed a systematic literature review that will be presented in Chapter 3.

The following describes how the literature addressed in this chapter will be discussed:

We first introduce entrepreneurial action (EA), which is the general field of research that our present work aims to contribute. This section discusses the concepts of entrepreneurial opportunity and opportunity belief. According to this theory, a fundamental aspect that differentiates entrepreneurs from managers of established companies is that the former base their actions on the belief (not know) of having a potential entrepreneurial opportunity. Furthermore, belief is one of the integrative elements of the judgment-based approach, and, as prior research has suggested (e.g., Kirtley & O'Mahony, 2020), pivot decisions might alter the entrepreneur's opportunity belief.

Second, we present the literature on entrepreneurial decisions, focusing on the entrepreneurial judgment theory and judgment-based approach (JBA) (Foss et al., 2019). This framework contemplates the relationship between Beliefs, Actions, and Results (BAR), which provides the basis for theorizing about the mechanisms through which entrepreneurs guide their decisions. In further developing this theoretical line, similarly to Griffin and Grote (2020), we drew on the psychological literature that discusses the cognitive science of belief. From this literature, we retrieve how external information interacts with individuals' beliefs and how individuals respond to it.

Finally, we discuss the failure in new ventures since pivots may be triggered by the emergence of new information that conflicts with prior beliefs indicating that some entrepreneurial ideas are no longer viable (Kirtley & O'Mahony, 2020; Marx & Hsu, 2015). In other words, when failures or potential failures emerge. In this section, we present the

definitions of failure and the attribution theory, which provides elements for understanding the perceptions of causality regarding the failures that have occurred (Weiner, 1972).

2.1 ENTREPRENEURIAL ACTION

The research stream on EA investigates the human activity related to introducing novelty to the world in the form of ventures (Alvarez & Barney, 2007; Wood et al., 2021). More specifically, Wood et al. (2021, p. 5) posit that EA is "concerned with the decision to take action toward entrepreneurial endeavors under conditions of uncertainty." From this assertion, we could highlight three central concepts: decision, action, and uncertainty. Regarding the decision concept, Alvarez and Barney (2007) argue that entrepreneurs constantly make decisions by making investments driven by beliefs and perceptions about opportunities they deem worth engaging and exploiting. Accordingly, these decisions are manifested in actions, mainly resource investments (Foss et al., 2019), which respond to a series of motivations and intentions, generating another series of outcomes (Hastie, 2001). However, entrepreneurs decide and act "without assurance of the outcome and therefore draw largely on what they imagine to be possible" (Wood et al., 2021, p. 6). In other words, EA is inherently uncertain (McMullen & Shepherd, 2006). For this study, we consider the Knightian uncertainty concept. Knight (1921) distinguishes between two 'types' of uncertainty; the measurable uncertainty, designated by the author as a 'risk,' and the unmeasurable uncertainty, designated as 'uncertainty' (i.e., the Knightian uncertainty). In this distinction, risks are susceptible to be reduced probabilistically, but not uncertainties, because the probabilistic "information about the future is incomplete, unknown, or unavailable" (Furr & Eisenhardt, 2021, p. 2).

Researchers in the field of EA indicate that what drives the actions of entrepreneurs is their belief that an entrepreneurial opportunity exists and is worth pursuing. However, it needs to be validated (McMullen & Shepherd, 2006). The opportunity belief can change during the new venture creation process and consequently alter the venture's course of action (McMullen, 2015), a situation intrinsically related to the pivot phenomenon. Furthermore, authors such as Kirtley and O'Mahony (2020) have informed that the pivots may be the cause for updating the opportunity belief. Given the relevance of these two concepts for the discussion of pivoting, in the following two sections (2.1.1 and 2.1.2), we further explore the concepts of entrepreneurial opportunity and opportunity belief.

2.1.1 Entrepreneurial opportunities

The term opportunity has been widely used and discussed, and there is a vast literature in which opportunities are central for the EA (Gruber et al., 2015; Klein, 2008; McMullen & Shepherd, 2006; Shane & Venkataraman, 2000; Wood et al., 2014). Notwithstanding, some scholars argue that the construct of opportunity lacks clarity and, in some cases, presents contradictions (Davidsson, 2015; Dimov, 2007). For instance, whether the nature of opportunities is subjective (i.e., opportunities only exist due to the action of entrepreneurs) (Klein, 2008; Shepherd et al., 2007) or objective (i.e., opportunities exist independently of the entrepreneur) (Shane & Venkataraman, 2000; Kirzner, 1997), and the implicit assumption of favorability that only is verifiable *ex-post* (Saemundsson & Candi, 2017, p.44).

Some other authors point out the evolving character of opportunities (Ardichvili et al., 2003; Busenitz et al., 2014; Wood & McKinley, 2010). In the words of McMullen (2015): "opportunity is not an oak tree born of an acorn of an idea. It is more like a stem cell that can grow into a host of body parts given the necessary environmental conditions" (p. 664). Hence, opportunities are not developed linearly; conversely, they are created through an iterative process involving several tests, assessments, readjustments of the initial version, and may even lead to an entirely different opportunity (Ardichvili et al., 2003; Dimov, 2007).

In a comprehensive literature review, Davidsson (2015) noticed that only a few authors provide a definition of opportunity, although varied. Some examples of the definitions of entrepreneurial opportunities identified by Davidsson are indicated in Table 1.

Table 1 – Examples of definitions of "entrepreneurial opportunities"

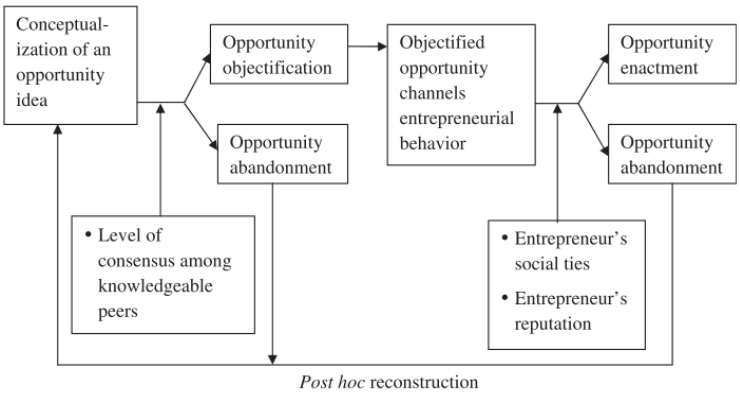
Authors	**Definition**
Shane and Venkataraman, 2000, p. 220; Shane, 2012, p. 15	[S]ituations in which new goods, services, raw materials, and organizing processes can be introduced and sold at greater than their cost of production . . . Entrepreneurial opportunities . . . require the discovery of new means-ends relationships.
Dutta and Crossan, 2005, p. 426	[A] set of environmental conditions that lead to the introduction of one or more new products or services in the marketplace by an entrepreneur or by an entrepreneurial team through either an existing venture or a newly created one.
Short et al., 2010, p. 55	[A]n idea or dream that is discovered or created by an entrepreneurial entity and that is revealed through analysis over time to be potentially lucrative.
Sarasvathy, 2003, p. 142	[A] set of ideas, beliefs, and actions that enable the creation of future goods and services in the absence of current markets for them.
Wood and McKinley, 2010, p. 68	[A] future situation that is both desirable and feasible, regardless of the resources currently under the control of the entrepreneur.
Gartner et al., 2008, p. 304	[P]erceived as positive situations that are controllable . . . must represent a desirable future state, involving growth or at least

	change; and the individual must believe it is possible to reach that state.
Sarasvathy, Dew, Velamuri, and Venkataraman, 2003, p.143	New idea/s or invention/s that may or may not lead to the achievement of one or more economic ends that become possible through those ideas or inventions (and) beliefs about things favorable to the achievement of possible valuable ends.
Busenitz, Plummer, Klotz, Shahzad, and Rhoads, 2014, p. 4	The discovery or creation of new means-ends relationships that can evolve from interactions between markets and environments.
Dimov, 2007, p. 720	The progress (idea + action) along with a continuum ranging from an initial insight to a fully shaped idea about starting and operating a business.

Source: adapted from Davidsson (2015, p. 679).

For entrepreneurial opportunity, we consider the definition proposed by Wood and McKinley (2010) as "a future situation that is both desirable and feasible, regardless of the resources currently under the control of the entrepreneur" (p. 68). The opportunities emerged after the reduction of ambiguity through social interaction, experimental actions, and the individual conviction that it is possible to influence the environment (Weick, 2001; Sarasvathy & Dew, 2005; Wood & McKinley, 2010). Figure 2 shows the framework suggested by Wood and McKinley (2010) regarding the production of entrepreneurial opportunities. In their model, the first stage of opportunity development is the conceptualization of the opportunity ideas where individuals envision images about the future and start to make sense (Weick, 1995) of the opportunities along with the early interactions with peers (for instance friends, family members or mentors).

Figure 2 – The production of entrepreneurial opportunity



Source: Wood and McKinley (2010, p. 71).

Wood and McKinley (2010) inform that during these interactions, entrepreneurs collect information and proceed to assess the idea's viability; if the data tend toward "viable," the individual will proceed to the objectification of the opportunity; otherwise, she/he will abandon

that idea. In the objectification process, the opportunity becomes objective and comprehensible for others and starts to lead the entrepreneur's behavior. At this point, entrepreneurs test the opportunity, explore possibilities to engage different actors and resources, and find a way to operationalize their aspirations into concrete results. Based on the feedback obtained from these explorations, entrepreneurs modify and enhance the opportunity, which may culminate in the opportunity enactment—i.e., "the initial establishment of a business venture" (Wood & McKinley, 2010, p. 72) or in the opportunity abandonment—i.e., the decision to not pursue the opportunity (Wood & McKinley, 2010).

Accordingly, Klein (2008) argues that opportunities are subjective and, differently from many authors (such as Alvarez & Barney, 2007; Casson & Wadeson, 2007; Kirzner, 1997; Shane, 2000), he suggests that opportunities are neither created nor discovered. The author argues that opportunities are imagined and exist solely in the mind of the decision-maker. Klein sets down a bridge between the concept of opportunity imagination and Boulding's (1956) notion of image, in which human behavior is the result of conscious images about the future and not only as a consequence of a particular stimulus. Similarly, Sarasvathy (2001) points out that before the achievement of products, "there is human imagination, and before there is a market, there are human aspirations" (p. 261). Therefore, opportunities involve a lot of information regarding the entrepreneur's background, knowledge, expectations, motivations, beliefs, and other cognitive aspects (Wood et al., 2014; Cornelissen & Clarke, 2010). The following section details the opportunity belief concept that outlines the rationale for the EA.

2.1.2 Opportunity Belief

Another key concept within EA is the construct of *opportunity belief* (OB). The underlying idea behind this construct is that entrepreneurs can only believe, not know, that there is an entrepreneurial opportunity that they could seize (Canavati et al., 2021; Wood et al., 2014). Wood, McKelvie, and Haynie (2014) defined OB as "self-centered mental images or 'theories' about the potential reward for a particular action versus the cost of that action" (p. 253). Moreover, OBs are not self-evidental (Quine & Ullian, 1978), i.e., these beliefs are not supported by observation and pertain to an abstract instance in the entrepreneurs' minds. As in the case of human action, beliefs play a central role in EA; they operate as a motor that drives

the entrepreneurs' acts (Klein, 2008; Shepherd, McMullen, & Jennings, 2007) and the business model (BM)[3].

Building from coherence theory (Rensink, 2000), which describes how attention is needed to enable the perception of change, Shepherd et al. (2007) establish that in order to form an OB, individuals start with an interpretation of the environment that is coherent with the available information, and then, a belief about an opportunity is formed. Their model has two methods for belief formation: the bottom-up process (from the environment to knowledge structures) and the top-down process (from the knowledge structure to the environment).

OBs are essentially ill-defined venture envisions; therefore, determining whether a given belief is an opportunity or not can only be known through the action resulting from a judgmental process (McMullen, 2015; Saemundsson & Candi, 2017). Like a scientific theory, entrepreneurial opportunity beliefs need to be validated, and during this process, some of the elements that constitute such beliefs will work, while many others will not (McMullen, 2015). As such, invalidated elements of the OB may be the prelude to a pivot. In the next section, we address another body of literature that examines how the judgmental process, which precedes action, is formed. Thus, in the following section, we discuss entrepreneurial decisions and entrepreneurial judgment theory.

2.2 ENTREPRENEURIAL DECISIONS

Entrepreneurial decision-making research examines essential elements intrinsically related to the pivot phenomenon. Authors such as McMullen and Shepherd (2006) and Packard, et al. (2017) have situated decision-making as one of the focal points of EA, which basically depends on the entrepreneurs' judgment. As we further explain in section 2.2.1, judgment "refers to the process of forming estimates of the value of future events (i.e. beliefs)" under conditions of uncertainty to determine what course of action to take (McCann, 2017, p. 596).

Several scholars (e.g., (Bryant, 2007; Ghezzi, 2020) suggest that entrepreneurs use heuristics—i.e., cognitive shortcuts that individuals use when resources and processing capacity are limited (Bingham, Howell, & Ott, 2019), to decide on their ventures. Eisenhardt and Bingham (2017, p. 251) argue that heuristics help individuals decide quickly, communicate the

[3] The BM is a structural template that reflects the operating logic and the management's hypothesis about the customers' needs and expectations, and how the firm, along with its partners, organizes, creates, delivers, and also captures a share of the value (Teece, 2010; Zott & Amit, 2010; Zott, Amit, & Massa, 2011; Morris, Schindehutte, & Allen, 2005).

rules to others, and "balance between efficient capture of expected opportunities and flexible capture of at least some unexpected ones." Heuristics-based decisions have been the subject of controversy in past discussions, particularly for the classical theorists of expected utility (e.g., Tversky & Kahneman, 1981; Vyse, 2014), who have argued that individuals make 'rational' decisions by combining the probability of the possible outcomes and weighted values (gains and loss). Accordingly, they claimed that heuristics are inherently biased, irrational, and error-prone mechanisms (Bryant, 2007). More recent studies advocate that heuristics and limited rationality are natural features (not imperfections) of human cognition and may be more suitable for complex and high-uncertain contexts (Gigerenzer, 2014). Previous studies (Bingham and Eisenhardt, 2011; Bryant, 2007) have demonstrated that decisions based on heuristics are more frequent for searching and assessing opportunities rather than for exploiting them. Some examples of common-used heuristics by entrepreneurs are to imitate the majority, imitate the best (Gilbert-Saad et al., 2018), or make strategic pauses to reflect on their ventures before deciding to change, abandon, or persist (McDonald & Eisenhardt, 2020).

One crucial factor related to entrepreneurial decision-making is that founders play an essential role. This fact is due to founders often feeling personally responsible for the new venture and their direct influence on the product, team structure, partnerships, and all the venture's decisions (Dencker et al., 2009; Haynie et al., 2012; Liñán et al., 2016). Consequently, entrepreneurs' feelings, emotions, background, and psychological well-being affect risk perceptions, preferences, and firm performance (Mattingly et al., 2016; Zhang and Cueto, 2017). The literature presents examples of cognitive attributes and biases that interfere with entrepreneurial decision-making. However, this literature is vast; thus, we perform a systematic literature review which results are shown in section 3.2.

Considering the aim of this study to outline the mechanisms through which entrepreneurs perform pivoting processes in their startups, we discuss the judgment process in the following section. This is consistent with several authors (Dimov, 2010; Uygur and Kim, 2016; Packard et al., 2017) who argue that judgment is the mechanism responsible for forming estimates to guide resource allocation during entrepreneurial activities.

2.2.1 Entrepreneurial Judgment Theory

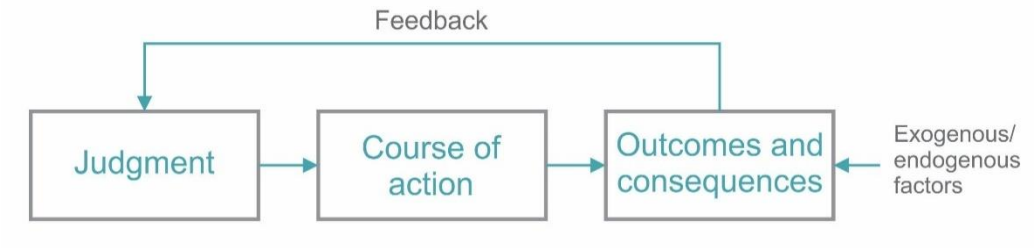
Judgment refers to the initial stages of the decision-making process concerned with estimating future events and outcomes based on limited data and, typically, following certain principles or heuristics (Foss & Klein, 2008; Grandori, 2010; Hastie, 2001; Tversky &

Kahneman, 1974). Under uncertainty, individuals cannot make 'objective' (also referred to as 'rational') decisions because they do not know all the variables and probabilities involved (Packard et al., 2017). Therefore, under these conditions, individuals 'subjectively' interpret the context and make judgments based on these interpretations (Packard et al., 2017). Although these interpretations or beliefs cannot be considered "good" or "bad" *ex-ante*, individuals grade their beliefs, and when they deem them to be sufficiently reliable, individuals proceed to take action (Ramsey, 2001; Westgren & Holmes, 2021). However, like all cognitive processes, judgments are subject to bounded rationality (Simon, 1955) and, consequently, susceptible to errors or biases (Bazerman & Moore, 2008; Fodor, Curşeu, & Fleştea, 2016).

Entrepreneurial judgment is a dynamic cognitive and intentional process (Brown et al., 2018; Packard et al., 2017; Dimov, 2010), largely tacit (Foss & Klein, 2008; Langlois, 2007), through which entrepreneurs organize, assess, and infer venture-specific knowledge and creativity to guide resource allocation decisions (Foss & Klein, 2008; Hastie, 2001; Klein, 2008; Uygur & Kim, 2016). There is still debate about the concept of entrepreneurial judgment, specifically between the Austrian approach (e.g., Foss & Klein, 2008; McMullen & Shepherd, 2006) and the effectuation researchers (e.g., Sarasvathy & Dew, 2013). Effectuation researchers define judgment as "the ex-ante ability to make decisions that turn out to be correct ex-post" (Sarasvathy & Dew, 2013, p. 285). Sarasvathy and Dew (2013) advocate that judgment is neither necessary nor sufficient for entrepreneurship in the effectual logic. However, even when effectuation diminishes the use of prediction and leverages unexpected results (e.g., exaptation) and creativity (Sarasvathy & Dew, 2013), it does not mean "that entrepreneurial action is random" (McMullen, 2015, p. 665). Klein (2008) considers the exercise of judgment essential to starting a firm because the information about crucial aspects (e.g., market, technology) is incomplete; in other words, judgment guides entrepreneurs' decisions "when the range of possible future outcomes (. . .), is generally unknown" (Klein, 2008, p. 177).

According to Hastie (2001), decisions have three components: Alternative actions (choice options of course of action), outcomes (the situations that occur after the decision), and consequences (the subjective evaluation reactions for each outcome). Additionally, Packard et al. (2017) suggest that judgment evolves regarding experimentation, learning, and both exogenous and endogenous factors. Entrepreneurs constantly evaluate their judgments in the light of new information; hence, they might lead to changes to "redirect the venture more closely toward the desired outcome, or even to alter the desired or expected outcome" (Packard et al., 2017, p. 10). Figure 3 shows the concept of the continuous judgment process proposed by Packard and researchers.

Figure 3 – The continuous judgment process



Source: adapted from Packard et al. (2017, p. 10).

In this model, the precedent and influencing factors are not considered, and it is not feasible to identify the mechanisms involved in the decision-making process. In this respect, Foss et al. (2019) propose the BAR (Beliefs, Actions, and Results) approach in which actions (or acts) are the unit of analysis for entrepreneurship rather than the opportunity. *Beliefs* are the set of ideas, goals, and preferences about the world, past, future, and current situations. *Actions* refer to the commitment of resources in order to execute entrepreneurial plans or projects. Finally, *results* are the situations produced from the actions which can be measured. Results include "both financial performance indicators and the entrepreneur's subjective sense of whether goals, personal or social, have been accomplished" (Foss et al., 2019, p. 9). In the Judgment-based approach (JBA), the entrepreneur's judgment is placed at the center of the entrepreneurial process. Moreover, entrepreneurship is conceptualized as a judgmental decision-making process that occurs under uncertainty (Foss & Klein, 2018).

In recent research, Foss, Klein, and Bjørnskov (2019) situated the entrepreneurial judgment processes within the context consisting of three levels: the *macro environment* (also known as institutional environment), the *task environment*, and the *intra-firm context*. The first refers to the context in which the firm is embedded; it comprises politics, economics, culture and society, technology, environment, laws, market, and industry. The second refers to the actors and aspects "with whom the focal organization has transactions" (p. 2). Finally, the third refers to the internal context of the organization, the founders, and the members working in it. These three levels are presented in more detail below.

Macro Environment

Several macro-environmental factors might contribute to changes within the startups and the emergence of failures. For instance, administrative costs and barriers to entry, credit

market frictions, or information asymmetry could enhance or hamper entrepreneurial activities (Crifo & Sami, 2008). Hacklin et al. (2018) point out that value migration among markets, industries, and firms is frequent in sectors "characterized by intense competition and innovation" and plays a major role in entrepreneurial activities. These migrations can happen due to various events, such as market shifting demands, new entrants, new technologies, or legal issues. Therefore, changes in macro-environmental aspects may influence several entrepreneurial decisions (Chaston & Sadler-Smith, 2012; Yüksel, 2012), including, of course, pivots (Hacklin et al., 2018).

During the COVID-19 pandemic, recent studies (e.g., Giones et al., 2020; Manolova, Brush, Edelman, & Elam, 2020) have reported how several entrepreneurs around the world have realized the need to redirect their ventures in an attempt to minimize losses or avoid closing their businesses. A scenario such as 2020 has unleashed an additional wave of concern about the increasing occurrence of catastrophic events that may make the uncertain entrepreneurial journey even more difficult.

Task Environment

Far from being an individual process, entrepreneurship requires the development of networks and relationships between actors that contribute to value creation (Jack, Moult, Anderson, & Dodd, 2010). Adner and Kapoor (2010) point out that the firm's competitive advantages might rely upon its capacity to manage the environments in which innovation is created. Adner (2006) analyzed the interactions between the firms and their environments from an ecosystem perspective. He defined the innovation ecosystem (IE) as "the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution" (Adner, 2006, p. 2). IE includes suppliers, customers, complementors, regulatory agencies, universities, venture capitalists, public or private technology and science institutions, funding agencies, and policymakers, among others (Gomes et al., 2018; Oh et al., 2016).

Entrepreneurs can employ different strategies to create and consolidate their IE. For instance, the creation of alliances and partnerships are common to access information, new markets, and resources (Dai et al., 2018; Hoskisson et al., 2011). These strategies and the actors involved in the ecosystems vary over time and are mutually affected by the focal firm (Jack et al., 2010). Finally, information and new ideas about the environment might stem from outside members—e.g., suppliers, investors, or customers (Abdelgawad et al., 2013; Ozcan, 2018).

Therefore, the plethora of players, relations, and uncertainties within the IE may influence the startup to pivot and reformulate its BM, OB, and/or product.

Intra-firm Context

New venture's characteristics such as age, accumulated experience-based learning, and size (i.e., complexity and the number of staff members) interfere in the risk preferences and decision-making process related to growth, change, or abandonment (Detienne et al., 2017; Mitchell & Shepherd, 2012; Wennberg et al., 2016). While increasing the operating time, the likelihood of exit tends to diminish due to the accumulated knowledge and level of expertise (Wennberg et al., 2016). Likewise, with a larger number of employees and organizational complexity, entrepreneurs have to focus on what is best for the entire firm, share information, and be open to negotiating changes (Detienne et al., 2017). Moreover, Holland and Garrett (2015) found that entrepreneurs with larger firms are more willing to monitor and pursue new opportunities than those with smaller ones.

Typically, startups have more than one founder and a small staff who participates and influences strategic decisions (Giardino et al., 2014; Picken, 2017). Thus, collective sensemaking about the external feedback, team members' knowledge, cognitive attributes, and biases may influence the pivoting decision (Abdelgawad et al., 2013; Dai et al., 2016; Grimes, 2018). Aspects such as team members' passion (Cardon, Post, & Forster, 2017), entrepreneurial team cognition (de Mol et al., 2015), collective optimism (Anglin et al., 2018), and intra-team trust (Dai et al., 2016) may also influence crucial decisions that affect the team structure. Similarly, stakeholders, advisers, and peers (Hasan & Koning, 2019) might affect the startup decisions (Mitchell & Shepherd, 2012). However, different opinions and particular interests may create conflicts and affect the collective norms about making strategic decisions (Appelhoff et al., 2016). Indeed, situations like pivoting may trigger the propagation of uncertainties with the potential to hinder entrepreneurial activities (Gomes et al., 2018a; Gross & Geiger, 2017).

Although enlightening, Packard's model (Packard et al., 2017) and BAR (Foss et al., 2019) are insufficient to understand how judgments are formed. For instance, Lounsbury et al. (2019) claim that the BAR model falls short in explaining how cultural factors impact the entrepreneur's judgment and what aspects can constrain or enable entrepreneurial processes. The authors, drawing upon the theory of cultural entrepreneurship, aim to shed light on some external aspects related to cultural context and argue that they affect how entrepreneurs

understand, interpret, and navigate their environments "to obtain needed and valued resources" (Lounsbury et al. 2019, p. 1231). Sharing the same interest as Lounsbury et al. (2019) in enhancing our understanding of the judgment but adopting an alternative line of discussion, we decided to develop a more in-depth approach to the intrinsic aspects of the individual regarding judgment. In doing so, similarly to Griffin and Grote (2020), we drew on the psychological literature, specifically on the rationality and belief fields, which constitute the basis for the judgmental process in accordance with the BAR model (Foss et al., 2019). We discuss this regard in the following section.

2.2.2 Unpacking the Judgment: The Cognitive Science of Belief

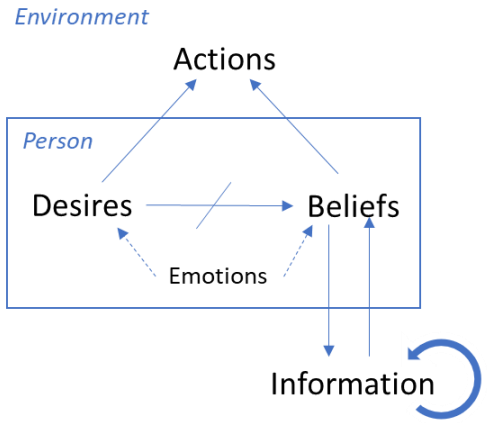
The traditional judgment and decision-making approach aims to compare judgments to standards or normative models of decision-making to elucidate whether a decision was correct or incorrect (Baron, 2004). The main normative models stem from utility theory (Sadler, 2021), prospect theory, probability theory, and statistics (Baron, 2004) which have been extensively discussed in business scholarship (e.g., Grandori, 2010; Hastie, 2001; Mullins & Forlani, 2005). Notwithstanding, these theories have been the subject of divergent critics claiming that individuals often behave differently from what is presupposed in these models (Henckel et al., 2021; Stanovich & West, 2003). Indeed, when the cognitive cost of verifying information is too high, individuals typically rely on heuristics (Gigerenzer, 2014). The discrepancy between the normative models and their opposers is partly due to constraints in rationality (Simon, 1972), individual context (Holland & Shepherd, 2013), misconceptions around uncertainty and risk, and misconceptions about what is considered rational and non-rational (Röth et al., 2019).

According to Denes-Raj and Epstein (1994), normative theorists have argued that behavioral deviations from the norm—when people do not look to optimize their profits or minimize their losses—derive from irrational judgments. Conversely, the opponents of this view (e.g., Brown et al., 2018; Mises, 1998; Vyse, 2014) claim that all deliberate action is necessarily always rational because it results from a mental process: a "judgment about how to best pursue the goal" (Brown et al., 2018, p.2). Moreover, rationality is always determined by 'subjectivity;' this is, it depends on the individual's determination. Therefore, there cannot be 'irrational' (non-subjective) decisions, at least in the absence of psychological limitations (Brown et al., 2018).

The standard model of rationality (Figure 4) proposes that individuals take actions based on their desires, emotions, and beliefs fed by information. According to Elster (2009b), desires

and beliefs belong to individuals and are the reasons for action. Desires include preferences (e.g., likes, risk appetite) and egoistic or altruistic tendencies. Beliefs entail the options and outcomes that individuals think are available for them. It is important to note that although rational, beliefs can be false (Elster, 2009b). People build their beliefs from the evidence that they already have (i.e., knowledge). However, beliefs can also be shaped by desires, often not directly (that is why the broken arrow in between, Figure 4), but can influence how a person gathers information, such as which sources to search or the amount of information to acquire.

Figure 4 – Standard model of rationality



Source: adapted from Elster (2009a, p. 7).

Mandelbaum (2014, p. 77) states that beliefs are "relations to contents" that allow us to make judgments about situations. However, when people deem that what they have at hand is insufficient, they seek to gather new information. The gathering process occurs in an iterative fashion, as shown by the looped arrow in Figure 4. Its length depends on the quality and quantity of information available in the environment and how much sense the new information makes to the individual (Elster, 2009b). This process is also regarded as *updating beliefs* (Elster, 2009a), which is discussed in the following section.

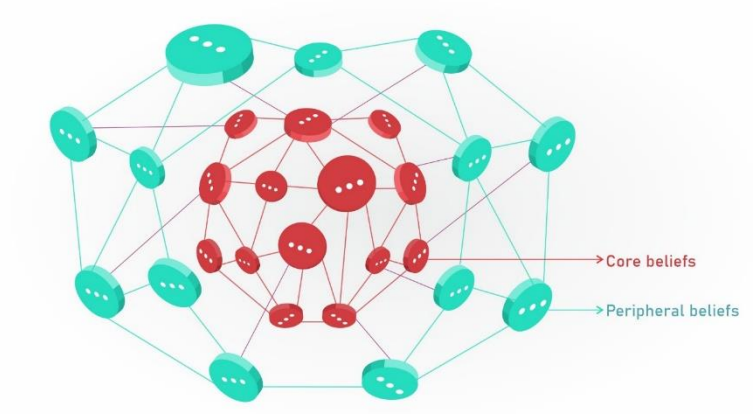
Updating Beliefs

Considering that pivots are decisions that lead to a change in the venture's course of action, it is appropriate to examine how beliefs (which drive the individual's action) are updated. In the standard model of rationality and the Bayesian model, it is suggested that individuals look for new data available in the environment to enhance the consistency of their beliefs and better understand the possible opportunities and outcomes (Alvarez & Parker, 2009;

Elster, 2009a). However, several studies (e.g., Anderson, 1983; Lepper & Ross, 1988; Ahn, 2012) provide evidence that updating the decision-making process via Bayes' rule (by updating the probability distribution about future events) does not represent the way how individuals actually update their beliefs—instead, it exemplifies our best ability to be rational. For instance, Mandelbaum (2019) shows how individuals systematically disregard factual information (such as scientific evidence or argumentation) and not only do not update their beliefs but even reinforce them.

Authors such as Gilbert et al. (1998), Mandelbaum (2019), and Porot and Mandelbaum (2020) have attributed this counterfactual response to the psychological immune system (PIS). Similar to the physiological immune system that defends from possible threats such as viruses or bacteria, the PIS defends the organisms from ideas and information that are not seen as new evidence "but instead as a deep psychological threat" (Porot & Mandelbaum, 2020, p. 7). According to Gilbert et al. (1998), the PIS employs several mechanisms and biases such as positive illusions, self-serving attribution, or confirmation bias to protect "our most core beliefs, the ones that make up our sense of who we are (such as the beliefs that one is a good person, a smart person, and a dependable person)" (Porot & Mandelbaum, 2020, p. 7). Mandelbaum (2019) proposes that the center of our network of beliefs is constituted by beliefs that enable us to create an identity of ourselves, while at the periphery are the beliefs non-related to the self, which are more prone to be updated even by the Bayesian rule. Figure 5 represents the relationship between these beliefs schematically.

Figure 5 – Network of beliefs



Source: created by the author.

Therefore, when information from the outside is understood as a threat to the core beliefs, the PIS will activate mechanisms to reject it actively. In other words, the information is

regarded as false or inconsistent in order to prevent the individual from being psychologically disturbed and stressed (Bendaña & Mandelbaum, 2021; Porot & Mandelbaum, 2020). According to Mandelbaum (2019, p. 145), this situation may cause three possibilities: (1) the individual will fail to learn information that he or she should learn (i.e., learning blindness), (2) the individual does not update beliefs when he or she should update (i.e., belief perseverance), and (3) the individual will harden his/her former belief (against objective evidence). It should be noted that people "may be generally unaware of the influence" of their PIS, so it works more like an unintended system (Gilbert et al., 1998, p. 619).

Exploring the literature on the cognitive science of belief and how beliefs are structured and stored—which according to Bendaña and Mandelbaum (2021), is in its infancy—enlightens us regarding how the initial building block (i.e., Beliefs) of the BAR judgment model works. On the one hand, we understand that entrepreneurial decisions are naturally conditioned by subjectivities and feelings, and depending on the situation (e.g., the urgency of the response, uncertainty), each decision will be derived from a more or less automatic or intuitive process. On the other hand, it is possible to elucidate that there are two main responses or attitudes when facing new information that is not coherent with the individual existing knowledge: belief updating or belief persistence. Therefore, it is expected that during pivot decisions, where changes are expected to occur, entrepreneurs update their beliefs concerning their startups.

However, a crucial aspect requires a more elaborated understanding: the new information that triggers the whole process of judgment in pivot decisions. Considering that one of our interests is to conceptualize pivots better, we propose that what unleashes pivoting is new information that challenges original ideas about the venture or indicates that some prior beliefs are no longer viable (i.e., failures). Thus, having already explored judgment and examined the beliefs and individuals' attitudes towards them, in the following section, we will explore aspects related to failure in new ventures.

2.3 FAILURE IN NEW VENTURES

Following previous studies (e.g., Kirtley & O'Mahony, 2020; Marx & Hsu, 2015; Tekic & Koroteev, 2019), we propose that pivots are triggered by the emergence of new information that conflicts with prior beliefs; in other words, when failures or potential failures emerge. This section discusses the concept of failure and the attribution theory, which provide essential elements to our conceptual framework.

2.3.1 Failure Definition

Failures typically accompany the venture creation process (Artinger & Powell, 2016; Politis & Gabrielsson, 2009; Storey, 2011). Such situations are stressful and may induce feelings of grief, loss of self-esteem and reputation, and diminishing social capital and financial resources (Crifo and Sami, 2008). These negative feelings may lead to biases regarding the over-and underestimation of negative and positive outcomes that may affect the startup's performance (Shepherd and Cardon, 2009).

However, failures may be an important source for learning, getting more experienced, and making better decisions over time (Baumard & Starbuck, 2005; Byrne & Shepherd, 2015). Failures can help firms discover uncertainties that are difficult to detect in advance, drive organizations to focus on core problems (Morais-Storz et al., 2020), and stimulate efforts to change (Soetanto, 2019). In fact, according to Cyert and March (1963), failures stimulate the firms to search for a solution and are more likely to lead to a change in an effort to improve the current situation.

Scholars have defined failure in business in different ways. For instance, McGrath (1999) defines failure as "the termination of an initiative that has fallen short of its goals" (p.14). Similarly, Shepherd (2003) points out that business failure "occurs when a fall in revenues and/or a rise in expenses are of such a magnitude that the firm becomes insolvent and is unable to attract new debt or equity funding; . . . [and] cannot continue to operate" (p. 318). Mueller and Shepherd (2016) define failure as "a life-altering event with potentially damaging consequences for all the major areas of an entrepreneur's life, entailing economic, psychological, social, and physiological costs" (p.458). For this study, we follow the failure definition provided by Politis and Gabrielsson (2009, p. 365) and Cannon and Edmondson (2001, p. 300) as "deviation from expected and desired results." In other words, a situation in which the results do not achieve the level of aspiration or expectation which conflicts with past beliefs about the venture (Morais-Storz et al., 2020).

Failures during the entrepreneurial process differ from failures in established companies. Along with the lack of resources, poor experience, and uncertain conditions, one single mismanaged failed aspect might put the startup out of business (Bajwa, Wang, Nguyen Duc, et al., 2017). Additionally, new enterprises look for legitimacy, which is "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995, p. 574). According to Suchman (1995), legitimacy depends on a collective audience, and new

firms look for legitimacy because they pursue credibility. Thus, failures may affect the startup and its members and the external actors' perceptions about the new firm and compromise the business relationships that enable the firm's existence.

Another very important aspect to consider is the fact that entrepreneurs are emotionally attached to the venture (Fang He et al., 2018; Shepherd, 2003). In some cases, when failures lead to the end of the initiative, the grief would be similar to the death of a family member (Shepherd, 2003). Failure may be painful, costly, stressful, and traumatic partially due to the intertwining of the entrepreneur's identity with his or her venture (Kuckertz et al., 2020; Mcgrath, 1999). Additionally, failures might cause negative emotions affecting financing, entrepreneurs' reputation, psychological well-being, and self-esteem (Baù et al., 2017; Jenkins et al., 2014; Shepherd & Cardon, 2009). It also might influence the entrepreneur's motivation, judgment, and subsequent performance (Fang He et al., 2018; Shepherd & Cardon, 2009; Wolfe & Shepherd, 2015). Furthermore, Crifo and Sami (2008) set out that failure may be extremely stigmatized, "implying a high cost of capital" (p. 587).

Interestingly, negative emotions do not necessarily mean a bad thing. Wolfe and Shepherd (2015) note that negative emotions may contribute to "maintain attentional focus, promote deeper information processing, enhance spatial performance, elevate acceptable performance standards, and increase the likelihood of subsequent goal attainment" (p.681). In the same way, with high levels of growth, failures are considered part of the learning process, and entrepreneurs are more likely to abandon the failed project or idea (Crifo & Sami, 2008). Authors have suggested some strategies to shift the failure towards a situation from which the entrepreneurs can learn and result favored. For instance, Shepherd and Cardon (2009, p. 933) suggest that self-compassion (i.e., "self-awareness that one is experiencing a sense of loss, determination of the source of that loss feeling, and intention to respond to the loss by doing something about it") might help diminish the negative emotions and promote learning from failure as self-compassion recognizes success and failure as part of the human experience.

In order to learn from failure, it is necessary to be aware of it and deem that it is possible to obtain benefits from the situation (Mueller & Shepherd, 2016). Entrepreneurs need to reflect on 'what might have been the cause of the failure?' or 'why did this happen?' Yamakawa et al. (2015) suggest that entrepreneurs must structure their understanding based on *sense-making* (Weick, Sutcliffe, & Obstfeld, 2005), which involves retrospective linkages to determine the possible causes. Then, entrepreneurs modify their beliefs and update their knowledge structure (i.e., they learn) (March, 1991).

The literature offers several approaches and recommendations to cope with failure. For instance, Soetanto (2017) found that, when facing difficulties, entrepreneurs stimulate their involvement with networks to promote learning by strengthening their connections, creating and expanding new networks to renew their knowledge, and exploring new alternatives. Yamakawa et al. (2015) also suggest avoiding blaming fate, luck, or external circumstances for the bad outcomes. Entrepreneurs should internally seek the causes and be encouraged to scan new information to learn and recover from failure (Shepherd & Cardon, 2009; Yamakawa et al., 2015).

To further explore the topic of failures in new ventures, we discuss the attribution theory in the following section. This theory comes from areas of social and behavioral psychology. Although it has been scarcely addressed in organizational studies (Harvey et al., 2014) and even less in entrepreneurship research (Mantere et al., 2013), it undoubtedly brings interesting elements to the study of failures in new ventures.

2.3.2 The Attribution Theory

The attribution theory provides a practical conceptual framework for investigating "the perception of causality, or the judgment of why a particular incident occurred" (Weiner, 1972, p. 203). Attribution theorists (e.g., Graham, 1991; Weiner, 1972; Weiner, 1986) argue that understanding the assignment of responsibility for incidents contributes to understanding how people guide subsequent behavior. In its beginnings, the theory aimed to establish a deeper comprehension of the educational processes of schoolchildren, the influence of rewards and punishments, and individual differences in the perception of causality, i.e., the relationship between actions and outcomes (Weiner, 1972; Weiner, 1986). In entrepreneurship studies, this theory has been underutilized, focusing particularly on two aspects: locus of control or causality—that explores whether the cause to a given event is internal or external, and self-serving attribution biases—which explores situations in which people attribute losses to external factors while gains to internal factors (Harvey et al., 2014; Mantere et al., 2013).

According to Graham (1991), three fundamental dimensions comprise the perception of causality: Locus, Stability, and Controllability (Table 2). The 'locus' dimension refers to the attribution that locates the cause of an event as being internal or external to the individual. Regarding the internal causes, the most common is lack of ability or effort. On the other hand, the dominant external causes are bad luck and environmental conditions (Graham, 1991). The second dimension, stability, "refers to the perceived variability or permanence of a causal

factor" (Harvey et al., 2014, p. 131) and ranges from the perception of being a stable or unstable cause. However, in most cases, this dimension is studied alongside the locus dimension since stability may modulate the response derived from the locus. The controllability dimension refers to the attribution of responsibility or volitional influence that the individual possesses over a certain event. This third dimension ranges from the perception of the event being controllable or uncontrollable (Graham, 1991).

Table 2 – Casual dimensions in the attribution theory

Casual Dimensions	**Causes**	
Locus	Internal	External
Stability	Stable	Unstable
Controllability	Controllable	Uncontrollable

Source: adapted from Graham (1991, p. 8).

Weiner (1972) highlights that the way individuals perceive causality is very varied and depends, among other aspects, on cognitive biases, achievement motivations, and needs. Regarding the influences of rewards and punishments, researchers such as Dweck (2015) have emphasized that punishments for internal aspects such as lack of ability can lead to demoralization and even depression. Likewise, the author promotes the use of rewards to exalt mainly the effort and the process (e.g., strategy formulation, conduction, and completion) of the task. Furthermore, as Weiner (1972) and Dweck (2015) explain, internal-controllable attributions are most associated with a search for improvement of a given situation since it is considered that the improvement of the process can lead to a better future performance. To illustrate this, suppose there are two pupils; one of them attributes her poor performance in a determined task to a lack of effort, while the other attributes it to the teacher not liking her. According to the authors (i.e., Weiner, 1972; Dweck, 2015), the first pupil is far more likely to be willing to improve her performance by putting more effort into her assignment than the second since she believes that nothing she can do will improve the situation.

Finally, there is an important relationship between attributions and feelings, which in turn have an impact on subsequent behavior. For instance, uncontrollable-internal (e.g., innate silliness) or uncontrollable-external (e.g., discriminatory environment) attributions to negative events may trigger feelings of *helplessness* or *anger* that hinder the individual from taking any action to improve such a situation (Weiner, 1986). On the contrary, controllable-internal attributions to positive events may trigger feelings of *happiness* or *pride* that contribute to

building self-confidence, which in turn can motivate people to pursue more challenging goals (Dweck, 2015; Weiner, 1986).

Failure Attribution in Organizational Studies

Literature in organizations suggests two main attributions of failure: individuals' attributions (e.g., cognitive biases, poor knowledge and experience, and psychological issues) (Shepherd, 2003; Fisher, Kotha, & Lahiri, 2016) and those caused by external factors (e.g., changes in the environment) (Cardon et al., 2009). Among the individuals' attributions leading to failures, overconfidence has been pointed out as the most critical and common reason behind failure (Cain et al., 2015; Invernizzi et al., 2017). Similarly, Cardon, Stevens, and Potter (2009) propose two major categories of attributions of entrepreneurial failures: misfortunes and mistakes. In the category of misfortunes, failures are caused by events "outside of the control of the entrepreneur" (p. 82), such as demographic changes or natural catastrophes. On the other hand, in the category of mistakes, failures are attributed to individuals, for instance, "improper strategies or poor business models" (p.82).

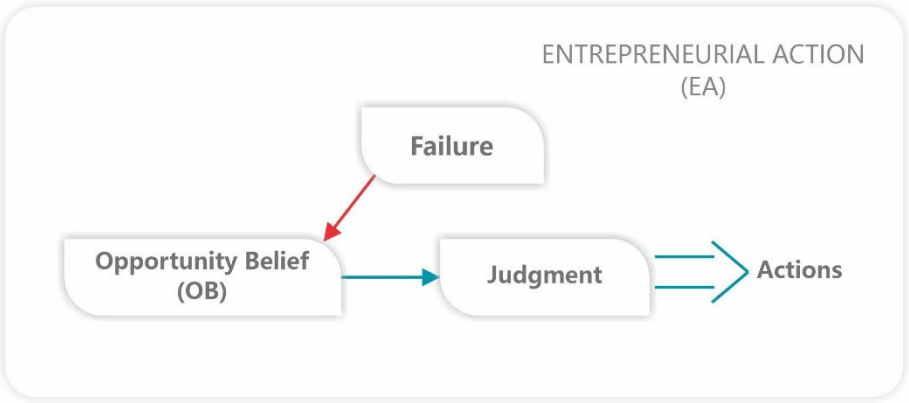
Kirzner (1997) identified two primary errors during the opportunity discovery: over-pessimism and over-optimism. Whereas the former, over-pessimism, "are those [situations] in which superior opportunities have been overlooked" (p. 83), the latter, over-optimism, occurs when the entrepreneurs expect to complete a plan that cannot be completed. Artinger and Powell (2016) also suggest two kinds of explanations for failure. (1) statistical explanations referred to the errors which resulted from the entrepreneur's bounded rationality about estimating business opportunities and risk, and (2) psychological explanations or errors derived from biases such as overconfidence and competition negligence.

When analyzing how attributions to failure have been categorized in the organizational literature, we observe that there is a dichotomous relationship between internal or external attributions to the individual, i.e., relationships within the locus dimension. Therefore, we consider it as an opportunity to explore failure in startups under the lens of attribution theory to enrich the discussion and ultimately better understand the relationship between failure, judgment, and pivot decisions.

2.4 CHAPTER SUMMARY

In this chapter, we explored three lines of inquiry—embedded in the entrepreneurial action research field—that have implicitly addressed some aspects regarding pivot decisions and to which this dissertation aims to contribute. From this literature, we uncovered the primary building blocks that serve as the basis for the construction of our conceptual framework (see Figure 6).

Figure 6 – Primary building blocks for developing the conceptual framework



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In the first line of inquiry, we presented the concepts of entrepreneurial action, uncertainty, entrepreneurial opportunity, and opportunity belief. From this research stream, we retrieve two main points. First, EA results from exercising the entrepreneurs' judgment to decide under uncertainty. The cumulative effect of these decisions constitutes the entrepreneurial course of action, which can undergo several variations. Second, the belief that an entrepreneurial opportunity exists and is worth pursuing drives the EA. Moreover, the opportunity belief can change during the new venture creation process and consequently alter the venture's course of action, a situation intrinsically related to the pivot phenomenon.

The second line of inquiry discussed entrepreneurial decisions, the judgment-based approach (that serves us as a reference framework), and the science of belief, which provide a basis for uncovering pivot decision mechanisms. A fundamental aspect concerning entrepreneurial decisions is that founders—and more specifically, the founders' judgment, play an essential role. Judgment is assumed as a fundamental resource to drive the firm's course of action. Nonetheless, entrepreneurial judgment is subjected to cognitive aspects such as personality traits, feelings, experience, and individual beliefs. When considering pivots from the

judgment perspective, we understand that individuals have different interpretations and react differently to determined circumstances and influences. Therefore, to understand pivot decisions, it is necessary to explore founders' beliefs and responses individually. The JBA proposes three elements that comprise judgment: beliefs, actions, and results (BAR). Beliefs are the set of ideas, goals, and preferences that guide actions (or the commitments of resources), which in turn produce or alter situations that can be measured, i.e., the results.

Although the JBA provides us with the basic elements for entrepreneurial decision-making, it does not explain how beliefs that guide actions are formed or updated. In order to improve on this, we drew on the psychological literature, specifically on cognitive and belief fields. From these fields of research, we identified a standard model of rationality that shows the relationship between desires, emotions, beliefs, actions, and information. In this model, the individuals' beliefs drive the actions and can be updated by gathering and incorporating new information from the environment. The updating belief process depends on how much sense the new information makes to the individual, the quality and quantity of information available in the environment, and the type of belief that will suffer the alteration (i.e., core or peripheral).

From the third line of inquiry, we took into consideration failures and potential failures as pivot triggers. Failures are frequent during venture creation and can induce reactions that hinder or facilitate pivot decisions. Further, failures during the entrepreneurial process may affect the startup and its members and the external actors' perceptions about the new firm, threatening the startup's resource basis. Additionally, we explored the attribution theory that informs the perception of causality of events. From this literature, we retrieve that how people attribute the cause of incidents (whether internal/external, stable/unstable, controllable/uncontrollable) affects how people guide their subsequent behaviors. Finally, we identified how organization studies had addressed failure attribution. This body of literature had mainly proposed a dichotomous approach between 'internal' and 'external' causes. In other words, there are some failures attributable to bounded rationality (mainly biases such as overoptimism) and others attributable to external circumstances (such as technological changes).

In a nutshell, as Figure 6 shows, the OB—which drives the entrepreneurial actions—can often be affected by the emergence of failures. In such situations, entrepreneurs use their judgment to determine what actions to take to improve this scenario.

In the following chapter, we present the results of the systematic literature reviews that allowed us to delve into the pivot literature. Once provided with clearer concepts and elements of pivot decisions, we proceeded to build the conceptual framework that guided our empirical research and is presented in section 3.4.

3 SYSTEMATIC LITERATURE REVIEWS

This chapter presents two systematic literature reviews (SLRs) conducted to contribute to two research objectives: the first[4] one is dedicated to the conceptualization of pivoting, and the second[5] discusses the cognitive-affective attributes and biases that may affect pivoting; as pointed out by several authors (Gancarczyk & Ujwary-Gil, 2021; Hastie, 2001), such cognitive processes seem to have fundamental implications in entrepreneurial judgment during decision making.

In the first SLR, we explore the main contributions and concepts from existing literature that directly investigates the phenomenon of pivoting. Although emergent, the literature on pivots already presents increasingly divergent guidance on what constitutes a pivot decision, what triggers it, who ultimately decides to pivot, and what its consequences are. In order to shed some light on these aspects, through an SLR, we identified the different conceptualizations, research streams, and main theoretical foundations to elaborate a more refined definition of pivoting that bridges elements from the existing literature and thus provide a baseline framework for future studies on this phenomenon.

The second SLR is focused on investigating which cognitive-affective attributes and biases are more prevalent in pivot decisions. Considering that individual aspects such as personality traits or preferences may affect judgment during pivoting, it is important to know which individual cognitive aspects interfere in decision-making processes. Therefore, we performed an SLR following a two-staged process. First, we identify which cognitive attributes and biases generally affect entrepreneurial decisions. Second, we analyzed these cognitive elements in the light of two central constructs: the transformative purpose of pivot decisions and the failure as the triggering factor that leads to such decisions.

This chapter consists of three sections. The first section (3.1) presents the SLR regarding the conceptualization of pivoting. The second section (3.2) presents the SLR regarding the cognitive-affective attributes and biases that can affect pivoting. Finally, in section (3.3), we present our conceptual framework derived from the tenets of pivoting in new ventures (Flechas & Gomes, 2021; Wood et al., 2019), entrepreneurial judgment theory (e.g., Foss & Klein, 2012; Uygur & Kim, 2016), the cognitive science of belief (e.g.,

[4] This section resulted in the article "Pivot decisions in startups: a systematic literature review" published in the International Journal of Entrepreneurial Behavior & Research (impact factor: 4.412), 2021.
[5] This section resulted in the article "Cognitive-affective attributes and biases in pivot decisions" presented at the XIX Altec Congress, Lima, Peru, 2021.

Mandelbaum, 2019; Porot & Mandelbaum, 2020), and failure and attribution theory (e.g., Mantere et al., 2013; Weiner, 1972). Together, these research areas provide the foundations for structuring the present study.

3.1 WHAT IS PIVOTING? DIFFERENT CONCEPTUALIZATIONS

The current divergence in the conceptualization of pivoting calls for a conceptual and systematic review of existing literature that discusses this phenomenon. In this regard, an SLR is a powerful research strategy used to identify and systematically analyze the intellectual production in a particular field in terms of methods applied, level of analysis, examples, and theoretical background.

This SLR provides several contributions to the entrepreneurship literature. First, this study provides a comprehensive review that enables researchers to establish a starting point for developing future research on the pivot decision. Second, the findings improve the conceptualization of a pivot decision by summarizing prior definitions and proposing a refined definition that places entrepreneurial decision-making and judgment at the center of the discussion. Finally, the elaborated conceptualization highlights some contextual and specific characteristics (e.g., a decision made after a failure) that contribute to differentiating this particular decision from others.

3.1.1 Research Design

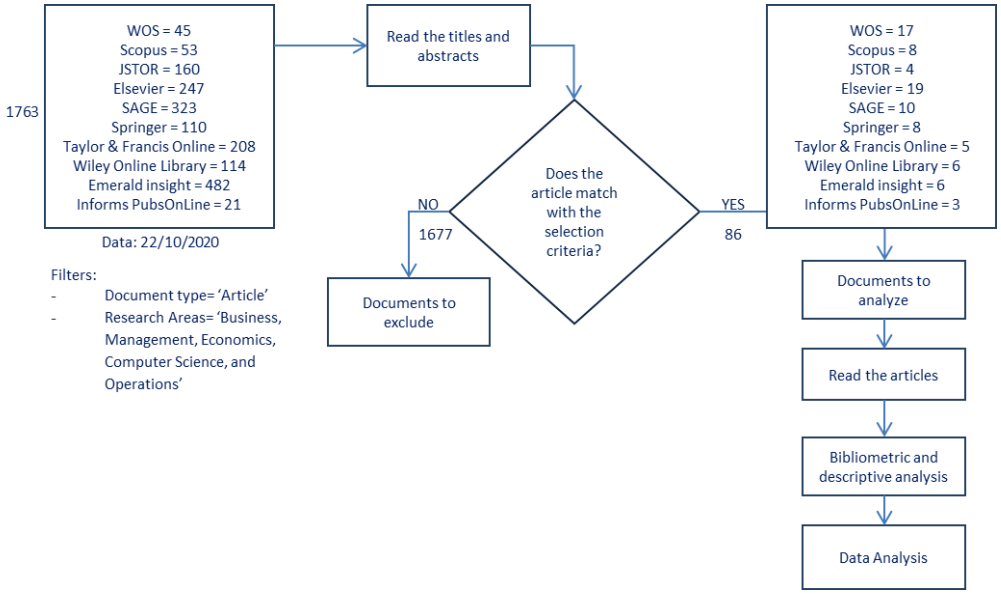
Identification of Literature

We performed an exhaustive search of several repositories and publishers for literature on pivots. We searched 10 English language databases: Web of Science (WOS), Scopus, SAGE, JSTOR, Elsevier, Springer, Taylor & Francis Online, Wiley Online Library, Emerald Insight, and Informs PubsOnLine. The following search query was applied: (“New venture*” OR “Startup*” OR “start-up” OR “new firm*” OR “entrepreneur*”) AND “pivot”). We did not limit the research to any specific timeframe and only included peer-reviewed articles published in academic journals. To reduce sample noise, the search was restricted to the areas of business, management, economics, computer science, and operations.

Conducting the Review

The search returned 1,763 documents. Despite applying filters, many articles were unrelated to our research; therefore, we carefully read the titles and abstracts to decide whether to discard or retain the article. We applied two criteria: the document must focus on startups or entrepreneurship, and the study must investigate pivots. After screening, 1,677 documents were discarded. Figure 7 shows the workflow of the SLR. The final sample includes 86 articles published in 56 journals from 2008 to 2020 (see Appendix A).

Figure 7 – Workflow of SLR



Source: created by the author.

Data Analysis

We employed a similar bibliometric analysis conducted by Lopes and de Carvalho (2018) to provide an overview of a particular knowledge field. We used the WOS bibliometric reports and Microsoft Excel to identify the main journals and the publications for each year and employed VOSviewer1.6.9 Software to create the citation analysis. The data were exported from WOS and Scopus in a *txt file, which was then populated with information from the other databases, so that it included all the data available (e.g., title, abstract, year, source, keywords, and cited references). We developed a co-citation analysis based on cited references to identify the central authors and how they are interlinked.

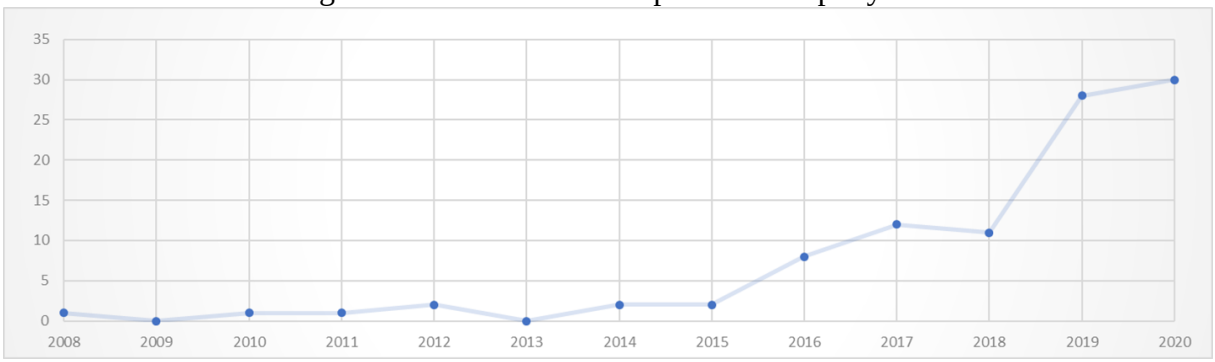
Following prior works (Eggers and Kaplan, 2013; Gomes et al., 2019; Saebi et al., 2019), we developed an interactive process for content analysis. We started by codifying the conceptualization of and main findings on pivots. We then identified the different perspectives researchers used to study pivots and clustered them into four research streams: Pivot Design, Cognitive, Negotiation, and Environmental perspectives. Finally, we proposed a refined definition of pivot decisions.

3.1.2 Findings and Discussions: How Literature Has Addressed Pivoting in Startups

Bibliometric Analysis

Figure 8 shows the evolution of publications across the years; it shows that 2019 and 2020 have been the most prolific years. The search was carried out until October 2020, and revealed that 30 articles had already been published during the year, surpassing the total number of publications in any of the individual years. This finding suggests a growing interest in topics related to pivoting in new ventures.

Figure 8 – The evolution of publications per year



Source: created by the author.

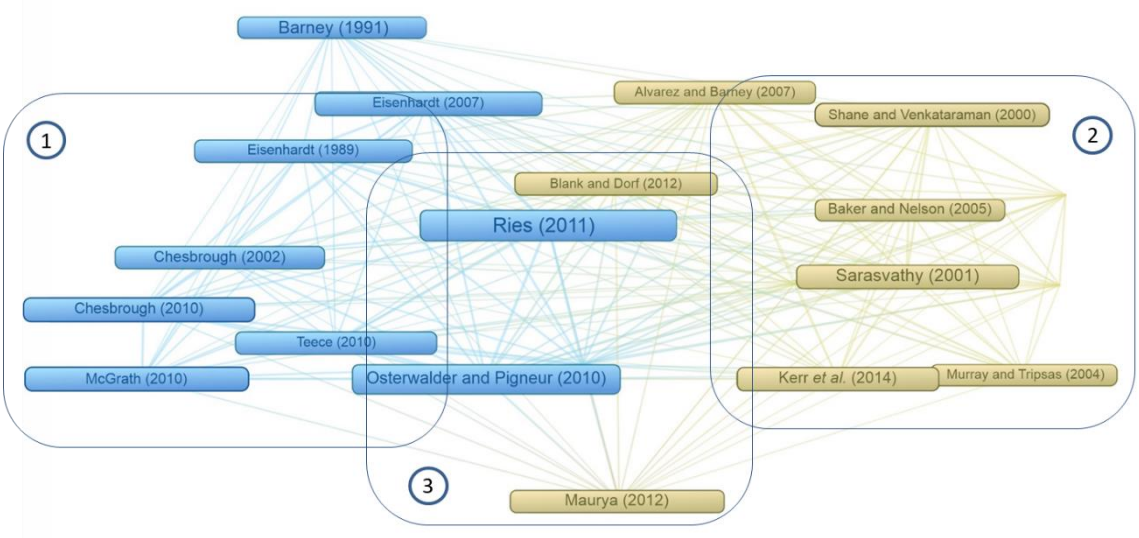
Out of the 86 pivot-related papers we evaluated, qualitative research methods were most commonly employed (66 papers in total), comprising 23 case studies, 25 theoretical-conceptual papers, 4 literature reviews, 5 longitudinal case studies, and 9 field studies. An additional 12 papers utilized quantitative approaches, including 6 that employed surveys, 3 longitudinal panel studies, 1 simulation, and 2 experiments. The remaining 8 papers used mixed approaches (3 papers) and other methods (5 papers). The predominant use of qualitative research is important evidence that the pivot literature is in an early stage of development. Scholars are increasing the primary data related to the phenomenon and building an initial theorization.

Within the empirical research (58 papers), the analyses were focused on the organizational level (37 papers); individual level, such as entrepreneurs, investors, and decision-makers (13 papers); the business model (3 papers); and the institutional environment, investments, strategic decisions, and startup team (5 papers).

Theoretical Foundations

Cited references were used to create the co-citation analysis; the most related items were identified based on the number of times they were cited together (see Figure 9). A minimum of seven citations of a cited reference was considered for this network; this depicts the relationship between the common references cited by the authors. We briefly discuss the most frequently cited references in the following review.

Figure 9 – Co-citation cited references network



Source: created by the author.

From this network, we can define three research groups: (1) on the left side, the literature is primarily concerned with BMs and how they can be renewed; (2) on the right side, authors examine the field of entrepreneurship, entrepreneurial behaviors, and heuristics; and (3) in the middle, topics are brought together with references mainly from the practitioners, discussing tactics and processes for startups and BM creation.

The first research group encompasses seminal papers such as Teece (2010), who defined the BM as the organizational and financial architecture of how an enterprise creates, delivers, and captures value. Other works focused on how BMs can be renewed or innovated. For instance, McGrath (2010) appeals to the discovery-driven approach that allows firms to adapt and navigate high-uncertainty environments. Chesbrough (2010) and Chesbrough and

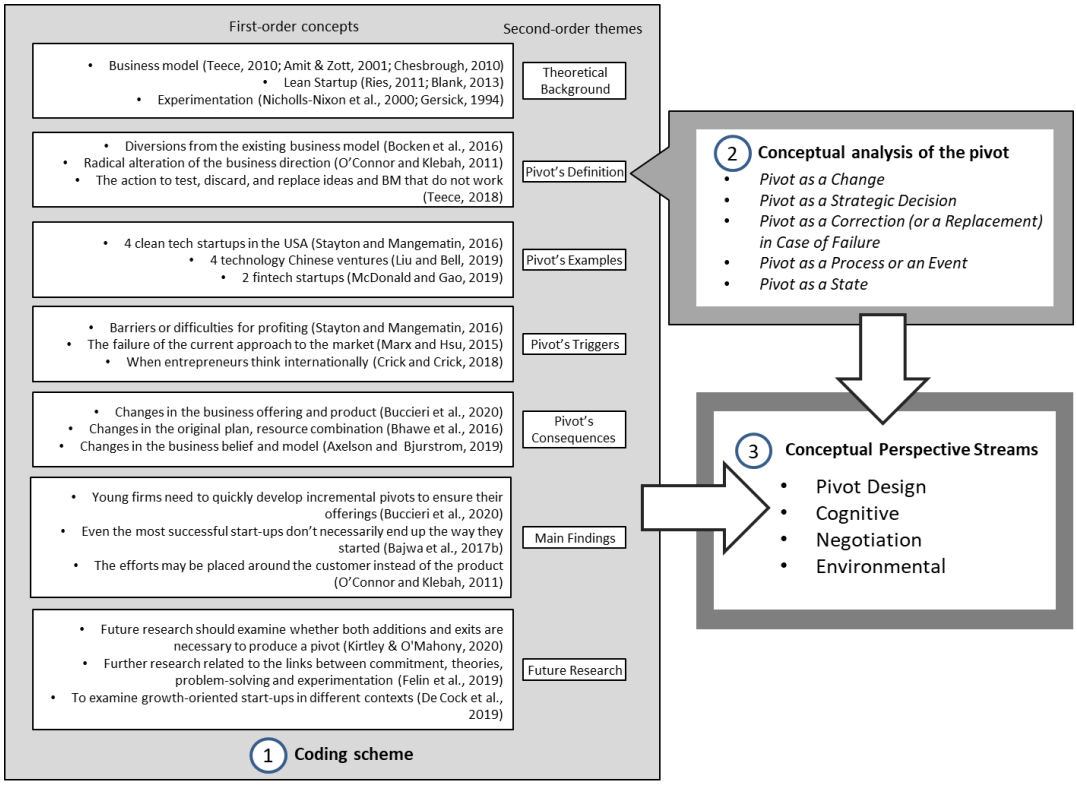
Rosenbloom (2002) study how processes of experimentation like effectuation might enable BM innovations. In the second group, the authors establish concepts and theories regarding entrepreneurship and entrepreneurial action (Shane & Venkataraman, 2000; Alvarez & Barney, 2007). Further, the authors propose adopting certain approaches and heuristics to create ventures—e.g., bricolage (Baker & Nelson, 2005), effectuation (Sarasvathy, 2001), and experimentation (Kerr et al., 2014; Murray and Tripsas, 2004).

Four books from the practice field were often cited in our sample. As expected, Ries (2011) is the most cited. In his book, the author presents the popular Lean Startup method, which consists of various processes and tactics (entailing pivots) through which entrepreneurs formulate, test, and validate hypotheses to build a sustainable business. Maurya (2012) advances the pivot conceptualization and proposes that it should be performed before product/market fit. The author claims to distinguish between pivots and optimizations, in which pivots aim to find *a plan that works* (by validating or not validating the BM) where the goal is to correct the course. In contrast, optimizations are concerned with *accelerating or refining that plan* where the goal is efficiency. Blank and Dorf (2012, p. 68) combine Lean Startup and the Business Model Canvas (Osterwalder & Pigneur, 2010) approaches and define a pivot as "a substantial change in one or more of the nine boxes of the business model canvas." The authors also propose a series of questions to help entrepreneurs decide whether to pivot (e.g., Did validation really convert opinions to facts? Did the product sell well and easily?).

Content Analysis: A Quest for a Definition

For the content analysis, we developed an interactive process similar to that in prior studies (e.g., Gomes et al., 2019; Saebi et al., 2019). Our content analysis consisted of three stages (Figure 10): 1) codification, 2) conceptual analysis of the pivot, and 3) conceptual stream identification. The first stage consisted of coding the sample, in which seven themes were identified: theoretical background, pivot definition, pivot examples, pivot triggers, pivot consequences, main findings, and opportunities for future research. In the second stage, we analyzed how authors conceptualized pivots (i.e., as a change, strategic decision, correction, process, event, or state). In the third stage, we identified the four conceptual perspective streams through which pivots have been studied—Pivot Design, Cognitive, Negotiation, and Environmental perspectives. Finally, we propose a definition of pivot decisions and build a baseline framework of pivots in which we discuss the constructs and propositions suggested by the literature.

Figure 10 – Content analysis process



Source: created by the author.

What is a 'Pivot'? Different Conceptualizations

As mentioned earlier, the term pivot was originally coined by Ries in 2009 and popularized in his book *The Lean Startup* (2011). The term rapidly gained widespread adoption among practitioners (Blank & Dorf, 2012; Maurya, 2012) but has only recently begun attracting the attention of scholars. While Ries' definition continues to be used by several authors (e.g., Crilly, 2018; Shepherd & Gruber, 2020), others have proposed additional terms to refer to this phenomenon, such as creative revision (Grimes, 2018), business model innovation (Brenk et al., 2019; Comberg et al., 2014), or iterations (Liedtka, 2015). There is growing evidence that the pivot concept may suffer from a proliferation of meanings and labels, as well as a lack of rigor. Examining all the papers in our database in detail, we identified five broad categories of pivot conceptualizations among the studies which establish an explicit definition: a type of change, a type of a strategic decision, a mechanism related to correction or replacement, a process or an event, and a state or condition.

Following the discussion of the different pivot conceptualizations, we identify the different theoretical perspectives related to pivots. Drawing on the findings from the analysis of conceptualizations and different perspectives, we propose a refined definition of the pivot.

Pivot as a Change

In this category, authors are concerned about distinguishing a pivot from other types of changes. The pivot conceptualization is centered on change, that is, the action of transforming or modifying something over time (Rensink, 2002). In some cases, these terms are coupled with adjectives to highlight the level of criticality, such as: major (Camuffo et al., 2020), strategic (Mäntylä et al., 2017), and fundamental (Tekic & Koroteev, 2019). These terms may also highlight the level of velocity, for example, rapid (Axelson & Bjurström, 2019; De Cock et al., 2019) or quick (Seggie et al., 2017). Regarding what is affected by the change, we identified eight main points—strategy (Brenk et al., 2019), direction or course (O'Connor and Klebahn, 2011), BM (Frederiksen & Brem, 2017), idea (Axelson & Bjurström, 2019), business concept (Vogel, 2017), product (McGinn, 2012), hypothesis (Yang et al., 2019), and the offering (Buccieri et al., 2020). We also identified the purposes of the pivots related to change: to avoid following ideas with limited potential (e.g., Axelson & Bjurström, 2019), to find a BM that is repeatable and scalable (Tekic & Koroteev, 2019), to test another possibility after the failure of a strategic approach (Marx & Hsu, 2015), to improve or drop a product and shift to something else (McGinn, 2012), and to connect and integrate other BMs with superior profitability potential (Aversa et al., 2020).

Based on this research stream, scholars regard a pivot as a particular type of change with regard to what is changed and the degree of criticality of change.

Pivot as a Strategic Decision

A growing research stream includes scholars who frame pivots as strategic decisions and note the roles of entrepreneurs in such decisions. Some authors refer to pivots as the process of choosing a course of action that entails an effort to change (Pillai et al., 2020). Similarly, Bajwa et al. (2017a, 2017b) posit that pivots are decisions that lead to change in one or more, but not all, of the startup's components. Hampel et al. (2020) suggest that firms decide to pivot in order to transform themselves to survive and grow when resources are limited, and the current course of action has revealed itself as unsustainable. Likewise, Pillai et al. (2020) maintain that pivots are strategic choices between alternative strategic commitments, often involving substantial risk and investments and determining the startup's fate.

Pivot as a Correction (or a Replacement) in Case of Failure

In this research stream, scholars hold that a pivot is associated with failure (or potential failure) of a relevant aspect of value creation (Crilly, 2018; McMullen, 2017; Shepherd & Gruber, 2020). First, scholars refer to a pivot as a correction of orientation or course of action (Ladd, 2016; Conway & Hemphill, 2019). These authors argue that a pivot is related to a review of failed hypotheses and an adjustment of the firm's course of action (Conway & Hemphill, 2019; Ladd, 2016; Leatherbee & Katila, 2020). Teece and Linden (2017) and Teece (2018) propose that pivots are actions designed to quickly test, exclude, and replace ideas and concepts that proved to be flawed. Likewise, Wood et al. (2019, p. 1637) suggest that a pivot is intended not only to make a change but also "to drop a current offering in favor of a completely new concept." Here, the focus is on dropping a flawed initial BM and its concepts and replacing them with more promising ones. In these last two conceptualizations, the implicit idea is that some elements in the original BM did not work and must be corrected or replaced

Pivot as a Process or an Event

We identified two approaches to explaining pivots: processes and events. According to Pettigrew (1997, p. 338), a process is "a sequence of individual and collective events, actions, and activities unfolding over time in context." Within the process approach, some authors propose a series of well-defined stages (e.g., Stage 1, Starting the pivot; Stage 2, Enacting the pivot; Hampel et al., 2020), while others consider pivots much less structured processes similar to trial and error learning (e.g., Ghezzi, 2019).

The event approach considers events as the basic elements of a process, such as actions of finite duration (Sabherwal & Robey, 1993). Most studies fail to explain how the pivots occur and are more concerned with highlighting characteristics such as the velocity and iterativity—e.g., a pivot is a sudden shift in strategy (O'Connor & Klebahn, 2011)—of an event that led to a change at a certain time (Camuffo et al., 2020).

Pivot as a State

Another view of pivots contrasts with previously described research streams. For example, Bahrami and Evans (2011) do not consider pivots either as events or processes; instead, they consider that firms are in a fluid state where the concepts and BM remain

undetermined during their formation. Turnarounds happen all the time; change is a permanent state that enables new ventures to co-evolve with the constantly changing environment (McDonald & Eisenhardt, 2020). The length of this fluid state is determined by venture characteristics (e.g., technological dependence, type of product) and its business sector (Liu & Bell, 2019). Following this reasoning, pivots occur so frequently that entrepreneurs might not differentiate them from other types of decisions, changes, events, or processes.

Conceptual Perspective Streams

Beyond definitions, scholars also adopt different theoretical perspectives of pivots. We employed a framework similar to that of Mintzberg et al. (1998) to inductively classify the studies and pivot conceptualizations into four conceptual streams as presented in Table 3—Pivot Design, Cognitive, Negotiation, and Environmental perspectives (see Appendix B for more details). As we discuss below, each conceptual stream includes studies that present unique focus and nuances of the pivot decision. An analysis of these research streams also provides a comprehensive understanding of the pivot decision.

Table 3 – Conceptual streams

Stream	Description	Example
Pivot Design	The pivot is regarded as a deliberate process in which entrepreneurs conceive, strategize, and control its execution	Liu & Bell, 2019; Patvardhan & Ramachandran, 2020
Cognitive	The focal point lies in the cognition of the entrepreneur's and how their perceptions, rationality, experience, and behavior lead the decision and actions to pivot	Kirtley & O'Mahony, 2020; Wood *et al*., 2019; Grimes, 2018
Negotiation	This stream is concerned with the analysis of the negotiation between a firm and its stakeholders, aiming to mitigate the negative effects of the pivots, decrease resistance, and strengthen relationships	Hampel *et al*., 2019; McDonald & Gao, 2019
Environmental	Pivots are the firm's ultimate response to external challenges and changes; pivots are totally dependent on environmental factors such as competitors, customers' preferences, regulators, and other actors	Pillai *et al*., 2020; Bajwa *et al*., 2017; Young *et al*., 2018

Source: created by the author.

Pivot Design Perspective Stream. Pivots are deliberately conceived by the entrepreneurs who formulate a strategy and control its execution. In this stream, pivots are expected to occur; thus, the entrepreneurs establish certain measures to execute them in an optimal way. For instance, Liu and Bell (2019) argue that small hi-tech businesses should regularly update their BMs to

survive. The authors find that one of the firms studied—firm *B*, a mobile keyboard app developer—determined that it would adjust its business plan every quarter because of its extremely dynamic operating market. The firm adopted iterative product development methods to learn and turn around as quickly as possible. Similarly, McDonald and Eisenhardt (2019) describe how a financial advisor startup, *Zeus*, deliberately operated with an underdetermined BM (i.e., an incomplete and loosely formulated model) by offering only basic functionalities to better understand their market and customers' needs before choosing a particular BM.

The other authors in this stream (e.g., Balocco et al., 2019; Patvardhan & Ramachandran, 2020) suggest a sequence of stages aimed at successfully achieving a BM transformation. Some of these stages include imagining or identifying an alternate improved situation, hypothesizing the pathway, preparing the company and other key players, conducting and assessing tests, and scaling up the new strategy.

Cognitive Perspective Stream. The core aspect of this stream is how an entrepreneur's perceptions, experiences, and behavior lead to the decision to pivot and to the resulting actions. This stream comprises several study areas since it draws on various theoretical backgrounds related to cognition and decision-making processes. For instance, several works (e.g., Cohen et al., 2019; Wood et al., 2019; Kirtley & O'Mahony, 2020) focus on how entrepreneurs frame information from the market, advisors, or team members to decide whether to pivot. Kirtley and O'Mahony (2020) found that entrepreneurs decide to change their strategies when there is a divergence between new information and their beliefs. Likewise, Crilly (2018) and Wood et al. (2019) argue that new information influences the decision to be persistent or flexible. The interpretation of that information—and by extension, the decision to pivot—may also be constrained by lack of knowledge or by bounded rationality (Cohen et al., 2019), cognitive biases such as psychological ownership (Grimes, 2018; Shepherd & Gruber, 2020) or fixation (Crilly, 2018), academic background of the team (Leatherbee & Katila, 2020), and experience and perceptions about legitimacy and credibility (Domurath et al., 2019; Younger & Fisher, 2020). The type of decision-making logic that entrepreneurs use also influences pivots. According to several authors (Brenk et al., 2019; Yang et al., 2019), effectuation logic better enhances the search to renew the current model and reduces uncertainties; in contrast, Brenk et al. (2019) suggest that causation logic seems to be more appropriate in ensuring the renewal's execution.

Another topic within the cognitive stream is failure and the effects of failure on entrepreneurial decisions. Since several authors (e.g., Frederiksen & Brem, 2017; Ghezzi, 2019; Yang et al., 2019) point out that the trigger for pivoting is the total or partial failure of the current BM, entrepreneurs' attitude toward failures can shed light on how they will behave. Shepherd

and Gruber (2020) point out that failure during firm creation typically is painful because it may involve a sense of grief; they also highlight an anti-failure bias that seems to persist in the entrepreneurship literature. In contrast, Tekic and Koroteev (2019) note that firms have nothing to lose in the beginning as nothing exists, and they perceive failures as drivers for learning, following the Lean Startup motto "fail fast and fail cheap."

Negotiation Perspective Stream. This line is concerned with analyzing the negotiations between a firm and its stakeholders during pivots, aiming to mitigate negative effects, decrease resistance, and strengthen relationships. Hampel et al. (2020) found that pivots can undermine a firm's relationship with its key stakeholders, on whom it depends for resources. The authors suggest some strategies that mitigate the negative effects of pivots on relationships (i.e., creating empathy and highlighting the need for the change). Further, they also identify differences in the impact on relationships depending on when the pivots occur; pivots performed during the "early stages" have less potential for undermining stakeholder relationships than pivots adopted during the "later stages." Likewise, McDonald and Gao (2019) explain how firms communicate about pivots affects their relationships with supporters and key partners; they suggest a pivot is a process that requires deep social calculus to minimize the potential constraints.

Furthermore, startups should consider mechanisms that allow them to substitute resources and acquire new resources to perform a pivot (Stayton & Mangematin, 2016) and adopt a flexible strategy for approaching their resource providers (Dopfer et al., 2017). Finally, Trimi and Berbegal-Mirabent (2012) emphasize that entrepreneurs should be aware of the evolving roles of the different stakeholders attempting to capitalize on these new roles (e.g., co-creation of products with customers or suppliers).

Environmental Perspective Stream. In this stream, pivots are the firm's ultimate response to external challenges and changes; pivots are totally dependent on environmental factors such as competitors, customer preferences, regulators, and other actors. Many of the analyzed articles are included in this stream and advocate for experimental approaches (e.g., Axelson & Bjurström, 2019; Bajwa et al., 2017a). Pivots emerge after interactions between an offering and the market (O'Connor & Klebahn, 2011; Pillai et al., 2020), which occur iteratively and bring new information on how to refine the offering to deliver a more suitable product to the market (von Briel et al., 2018). Young et al. (2018) posit that ventures developing within environments that allow experimentation and flexibility are more likely to develop more innovative opportunities.

3.1.3 A Refined Definition of Pivoting

Scholars (e.g., Spigel & Harrison, 2018; Christensen et al., 2018) suggest that the existence of multiple and divergent conceptualizations might lead to limited contributions and inhibit the creation of a robust and unified research field. To overcome the potential issues associated with the existence of a wide variety of pivot definitions, we elaborated a refined definition of the pivot. Building on previous studies and the contributions from the research streams (e.g., Marx & Hsu, 2015; Hampel et al., 2020), we propose a definition of pivoting (or pivot decision) as a strategic decision made after a failure (or the identification of a potential failure) of one or more elements of the current business model (BM), which potentially threatens the startup's resource base. This decision changes the course of action, reconfigures the resource basis, and may modify the opportunity belief (OB) and one or more elements of the BM. A pivot, therefore, refers to the concrete action of change that redirects the course of the startup.

We identify a failure, or identification of a potential failure, as the trigger factor because this defines the differences between a pivot and other types of organizational changes such as optimizations and diversifications. This understanding is found in several studies. For example, in all coded examples and cases, the main trigger for a pivot was unsatisfactory results: for instance, the market niche was too small, causing declining revenues (Hampel et al., 2020); a potential customer was not willing to pay for the product (Kirtley & O'Mahony, 2020); a dominant technology emerged that threatened the firm's offering (Pillai et al., 2020); customer traction was low (Bocken et al., 2016; Sońta-Drączkowska & Mrożewski, 2019); or production costs were excessive (Stayton & Mangematin, 2016). Additionally, Maurya (2012) notes the importance of differentiating pivots from optimizations associated with refining a business model that has already been validated. Optimizations are associated with diversifications or expansions, which often occur when firms are relatively successful and have sufficient slack resources (Levinthal & March, 1993).

We suggest placing the entrepreneur and the entrepreneur's capacity for judgment about whether or not to pivot at the center of the pivot discussion, as judgment enables entrepreneurs to assess and infer future events and consequences based on limited data (Foss & Klein, 2008; Hastie, 2001). We do not intend to exclusively adopt the Cognitive stream, which focuses on the entrepreneur's perceptions, but we are interested in formally assigning the agent to this decision, which is often simply depicted as a change affecting the venture's course (e.g., Bajwa, et al., 2017a; Seggie et al., 2017).

Characteristics of Pivot Decisions

We identified seven characteristics of pivot decisions: transformative purpose, uncertain, causative, ambiguous, emotionally-charged, time pressure, and complex. Pivot decisions have a *transformative purpose*, i.e., a change is expected to occur (Morris, Kuratko, Schindehutte, & Spivack, 2012). The pivot's outcomes are *uncertain*. Combined with the fact that entrepreneurs perform under uncertain conditions (Townsend et al., 2018), it is highly likely that non-routine decision-making (which is the case of pivots) involves uncertainties too (Elbanna & Child, 2007). Pivots are *causative*, which means that they cause effects on one or more elements of the startup (Bajwa, Wang, Nguyen Duc, et al., 2017), the entrepreneurs, and the ecosystem. Entrepreneurs encounter substantial *ambiguity* in interpreting the signals surrounding entrepreneurship and pivot decisions (Ries, 2011; Blume & Covin, 2011). Pivots are massively *emotionally-charged*; emotions can arise both as influencing factors and as consequences (Biniari, 2012; Morris et al., 2012). Anxiety, fear, joy, surprise, regret, anguish, hope, thwarting, and satisfaction are a few examples of emotions that may emerge during pivot decision-making (Foo, 2011; Grichnik et al., 2010; Lerner et al., 2015; Shepherd & Cardon, 2009). Because startups operate at a fast pace and operate with resource restrictions, it requires a *prompt response* from entrepreneurs (Ries, 2011). Finally, pivot decisions are *complex* because they involve a large number of factors to consider (team members, investors, suppliers, technology, etc.) (Appelhoff et al., 2016; Bajwa, Wang, Nguyen Duc, et al., 2017).

Conclusion

This SLR summarizes our current understanding of pivot decisions in startups and offers a baseline framework for future studies. We identified the different definitions of pivots and characterized the approaches in prior research. Furthermore, these definitions were classified into four conceptual streams—the Pivot Design, Cognitive, Negotiation, and Environmental perspectives—to describe researchers' different perspectives on studying pivots. We then proposed an integrated and refined definition that can reduce the proliferation of terminologies and labels and increase clarity around the pivot concept.

3.2 COGNITIVE-AFFECTIVE ATTRIBUTES AND BIASES IN PIVOTING

Founders play an essential role during pivoting. On the one hand, founders are sometimes the only human resource a new venture has. On the other hand, they often feel personally responsible for the new venture. Thus, founders' cognitive-affective attributes, biases, background, and psychological well-being affect risk perceptions, preferences, and, therefore, pivot decisions. In this SLR, we investigate which are the cognitive-affective attributes (CAPS) and biases that can affect pivot decisions. We followed a two-stage process: First, we identify which CAPS and biases affect entrepreneurial decisions in general from the literature review. Second, we analyzed these cognitive elements in the light of two central constructs: the transformative purpose of pivot decisions, i.e., a change is expected to occur (Morris, Kuratko, Schindehutte, & Spivack, 2012), and the failure as the triggering factor that leads to such decisions, i.e., unsatisfactory results (Flechas & de Vasconcelos Gomes, 2021).

We found that cognitive adaptability/flexibility, counterfactual thinking, optimism, risk-taking propensity, self-regulation, exploratory style, self-efficacy, entrepreneurial passion, and openness are the CAPS most related to pivots. Additionally, we found fear of failure, locus of control, overconfidence, over-optimism, psychological ownership, solution/product blind adherence, persistence bias, risk aversion, inertia, confirmation biases, failure-driven biases, and self-serving attribution as the biases most related to pivots. We argue that awareness of these aspects can improve such a critical decision by promoting the establishment of more accurate metrics or by enhancing some cognitive attributes that help entrepreneurs make complex decisions during the entrepreneurial journey. Furthermore, we discuss how researchers can advance in this literature by proposing research opportunities.

3.2.1 Within-person Aspects in Entrepreneurial Decisions

In the entrepreneurship literature, knowledge is employed to guide decisions related to opportunity recognition (Shane, 2000), opportunity evaluation (Mitchell et al., 2007), and resource allocation (Uygur & Kim, 2016). In this line, Mitchell et al. (2002) propose the concept of entrepreneurial cognition, defined as "the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth" (p.97). Considering that entrepreneurs primarily depend on their own judgment to decide between alternative courses of action, it is expected that within-person aspects of personality, pre-entry knowledge, and prior experiences interfere with the pivot decision.

Shoda and Smith (2004) conceptualized personality as a cognitive-affective attribute system (CAPS) wherein the person's mental representations network activates thoughts, feelings, and behaviors. This system not always responds in the same fashion; even though the relative consistency of the responses, there are some variations commonly related to the situation specificity (Jones et al., 2017). In addition, there are several situations in which founders respond with pre-established 'mental rules' (i.e., heuristics, Acciarini et al., 2020) that may further be affected by bounded rationality and lead to biases. Biases are referred to as 'irrational beliefs' or misused heuristics that hinder the decision-making process based on factual evidence (Acciarini et al., 2020; Tversky & Kahneman, 1981). CAPS and biases change over time due to new information and the exposure to determined situations affecting the mental network of representations (Mitchell & Shepherd, 2012; Shoda & Smith, 2004). Together these views argue that some specific traits, biases, and CAPS can, in fact, affect the entrepreneurs' decisions. This argument is central to this study in which we approach the influence of CAPS and biases on pivot decisions.

3.2.2 Searching and Selecting the Literature

The following search query was applied: ((“strategic decision” OR “organizational change” OR “strategic flexibility” OR “strategic choice” OR “business model change” OR “reframing” OR “reorientation” OR “reconfiguration” OR “pivot*” OR “change direction” OR "change" OR "strategic change") AND ("startup" OR "start-up" OR “new firm*” OR “new venture” OR “entrepreneur*”)). Additionally, considering the year in which the term 'pivot' was coined (Ries, 2009), we considered articles published between 2008 and 2020. To reduce the noise of the sample, the search was restricted to the “research areas” of Business Economics, Computer Science, and Operations Research Management Science.

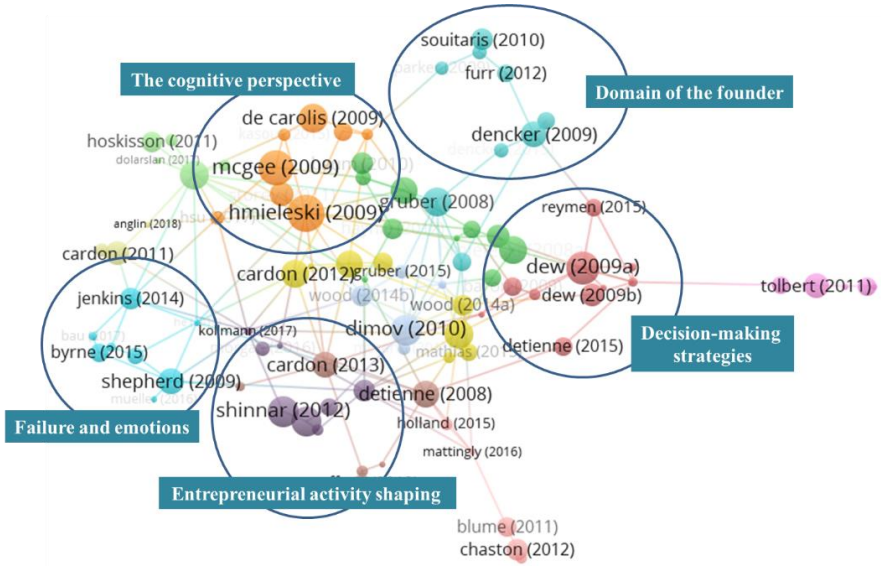
Furthermore, we applied the term filter “article” for document type, as these documents undergo peer review. The search was performed in the WOS database and in ten of the top entrepreneurship journals. The search on WOS returned 1824 documents; despite the application of filters, a large number of articles were found to be unrelated to our research; therefore, carefully read the titles and abstracts to decide whether to discard or maintain the article. We assessed two criteria: the document must focus on startups or entrepreneurship, and it must study strategic changes or decisions. After the screening process, 1754 documents were discarded. The final sample included 175 articles published in 48 Journals from 2008 to 2020.

3.2.3 Results

Theoretical foundations and main research groups

Cited references were used to create the citation analysis identifying the most related items based on the number of times they cited each other (See Figure 11). Although no minimum of citations was established, 68 items were eliminated because they were not connected with each other; this led to an analysis of 90 items. This network depicted a relationship between the common topics and interests of the authors. We identified five main groups of items which are described below.

Figure 11 – Citations analysis network



Source: created by the author.

The *decision-making strategies* group discusses which type of logic, whether effectual or predictive, is the most appropriate for entrepreneurial activities (Baron, 2009; Dew, Read, et al., 2009). In the *failure and emotions* group, authors suggest that entrepreneurial failure is massively charged by emotions comprising feelings of grief and loss that can lead to biases. However, it also serves as an important learning source (Shepherd & Cardon, 2009).

The *cognitive perspectiv*e group addresses how cognitive aspects can enhance or hinder entrepreneurial performance (Hmieleski & Baron, 2009). In the *domain of the founder* group, the authors suggest that the founder or the founder-leader significantly influences a firm's strategic decisions (Dencker et al., 2009; Furr et al., 2012). Finally, the *entrepreneurial activity*

shaping group discusses the role of individual and environmental aspects during a firm's formation (Shinnar et al., 2012; Kollmann et al., 2017).

3.2.4 Cognitive-affective Attributes and Biases in Pivoting

Baron (2004) and other researchers (Haynie et al., 2012; Uygur & Kim, 2016) suggest that there are several CAPS and biases that affect the entrepreneur's performance. For instance, Grimes (2018) notices that self-concepts, such as self-efficacy or psychological ownership, might regulate the willingness to revise the ideas. Notwithstanding, another strand of literature argues that the individual cognitive traits are not easily referable to an entrepreneur's performance in the prior studies or reveal a weak level of association (Hisrich, Langan-Fox, & Grant, 2007).

A preliminary study conducted by Ürü and colleagues suggests that the most cited entrepreneurial characteristics were risk propensity, need for achievement, locus of control, optimism, competitiveness, and innovativeness (Ürü et al., 2011). In a more recent study, Zhang and Cueto (2017) identified the most common biases (11 in total) present in entrepreneurial literature: overconfidence, over-optimism, self-serving attribution, illusion of control, the law of small numbers, similarity, availability, representativeness, status quo, planning fallacy, and escalation of commitment. In our literature review, we identify 52 CAPS and 27 biases strongly associated with entrepreneurial decisions (see Appendix C).

CAPS and Biases in Pivot Decisions and the Transformative Purpose

Based on our conceptualization of pivoting decision, we consider cognitive adaptability/flexibility, counterfactual thinking, self-efficacy, optimism, risk-taking propensity, and self-regulation as the cognitive-affective attributes most related to pivots. When considering the *transformative purpose*—i.e., a change is expected to occur (Morris et al., 2012), of pivot decisions, it is essential that entrepreneurs be willing to change and voluntarily undertake actions to alter firm performance. To this effect, cognitive adaptability and flexibility can certainly facilitate the propensity to adapt strategies and act promptly when required (Haynie et al., 2012). A risk-taking propensity also positively affects the attitude towards change and failure (Jiang et al., 2018). However, too many risky attitudes might lead to overconfidence bias (Zhang & Cueto, 2017). To counteract this effect, entrepreneurs can employ self-regulation mechanisms such as budgetary controls to consider their own limitations

and capabilities (Baron, Mueller, & Wolfe, 2016; Van Gelderen, 2012). Likewise, counterfactual thinking, self-efficacy, and optimism can diminish the rejection to change and enhance the recovery process from failure (Anglin et al., 2018; Arora et al., 2013; Uygur & Kim, 2016).

On the other hand, we consider the fear of failure, locus of control, overconfidence, over-optimism, psychological ownership, solution/product blind adherence, and persistence bias as the biases most related to pivots. Several scholars point out fear of failure and overconfidence as the two most influential biases during entrepreneurial decision-making (Kollmann et al., 2017; Morgan & Sisak, 2016). Fear of failure can increase the natural aversion to change, leading entrepreneurs to persist in the same past strategies regardless of the negative outcomes (Batra, 2016; Holland & Shepherd, 2013). Conversely, do not consider or underestimate the negative outcomes (that may lead to overconfidence and overoptimism biases) may also jeopardize the firm performance (Zhang & Cueto, 2017). People tend to feel more comfortable following the same patterns. This trend is sharper when people are specialists in a determined area and do not have enough knowledge to adopt a different strategy (Furr et al., 2012). This situation can lead to solution/product blind adherence, a very common bias among entrepreneurs that may affect pivot decisions (Ambos & Birkinshaw, 2010; Eggers, 2016; Warnick et al., 2018). Similarly, psychological ownership may reduce the entrepreneurs' willingness to cede control over their original ideas and even relinquish or adjust them in response to external feedback (Grimes, 2018). Finally, locus of control may hamper failure recovery since one of the initial steps in this process is to recognize the causes and assume the responsibility in order to learn and take appropriate actions (Shepherd & Cardon, 2009; Yamakawa et al., 2015).

CAPS and Biases in Pivot Decisions and Failure

There are several biases associated with failure in the literature: risk aversion, fear of failure, inertia (do not act), confirmation biases, self-serving attribution, and those referred to as 'failure-driven biases,' which lead to persisting in a particular path (Kollmann et al., 2017; Zhang & Cueto, 2017). Drawing on Mark Twain's analogy about a cat sitting down on a hot stove lid, Denrell and March (2001) propose the hot stove effect. This effect is a type of anti-failure bias in which a negative effect (e.g., a burn by sitting down on a hot stove lid) will lead to establishing a golden rule (e.g., do not sit down ever again on any stove lid, even on a cold one) and be hesitant to take up new alternatives.

Among ‘failure-driven biases’ is the technological adherence which is associated with the concept of ‘design fixation’—“a blind adherence to a set of ideas or concepts limiting the output of conceptual design” (Crilly, 2018, p. 52) and might be related to the origin of the domain knowledge, and passion. Furr, Cavarretta, and Garg (2012) found that executives with extensive domain experience tend to reduce technological change, while executives who bring experience from outside undertake major technological change. In this line, Warnick and colleagues (2018) note that ‘product passion’ (i.e., passion for the product and technology) might contribute to blind adherence and diminish the propensity to change. Furthermore, Eggers (2016) suggests that focusing on markets and customers’ expectations may diminish some implications of failure biases, such as blind adherence to a determined product or technology or risk aversion. Therefore, too much focus on the solution/product might hinder the decision to pivot.

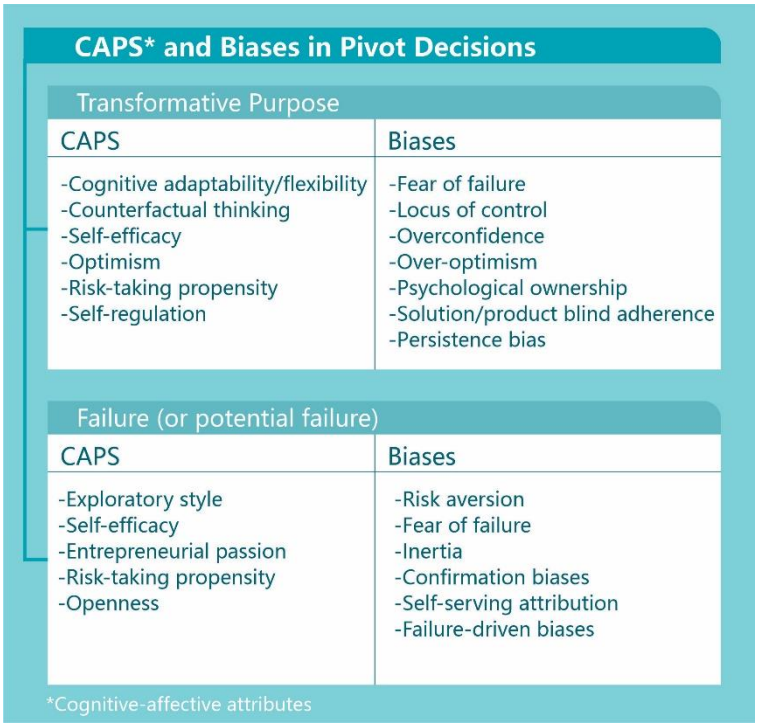
People and organizations also tend to manifest uncertainty-avoidance, fear of failure, loss aversion, and unwillingness to change (Denrell & March, 2001; Morgan & Sisak, 2016). However, this behavior may be an oxymoron when discussing entrepreneurs because new firms fail, so entrepreneurs should embrace the failure as a part of the entrepreneurial process and propose strategies to learn and recover from failure (Dew, Sarasvathy, et al., 2009; Eggers & Song, 2015; Politis & Gabrielsson, 2009). Another frequent bias from failure is self-serving attribution that occurs when an individual takes credit for success while attributes failures to external and uncontrollable factors such as bad luck (Mcgrath, 1999; Zhang & Cueto, 2017).

Some strategies and cognitive attributes help entrepreneurs to cope with failure and failure’s biases. For instance, Muehlfeld et al. (2017) proposed the exploratory style strategy in which entrepreneurs decide to persist with the current strategy while exploring new alternatives following a parallel trial-and-error rather than a sequential approach. Traits such as self-efficacy, openness, entrepreneurial passion, risk-taking propensity (Jiang et al., 2018), and previous experiences of failure (Politis & Gabrielsson, 2009) positively affect the attitude towards failure, diminish the levels of over-optimism, and motivate entrepreneurs to act opportunistically. Finally, learning from failure is facilitated when entrepreneurs use an intuitive cognitive style (Mueller & Shepherd, 2016), avoid blaming fate or external circumstances for the bad outcomes (Yamakawa et al., 2015), and create mental images that allow them to anticipate negative outcomes (Bingham & Kahl, 2014). This last consideration can have an important link with pivot decisions since attitudes such as those described could encourage entrepreneurs to recognize the need to change the course of action, formulate alternative options, and ultimately, pivot.

Conclusion

In this SLR, we analyzed the CAPS and biases identified in the light of two central constructs: the transformative purpose of pivot decisions and the failure as the triggering factor that leads to such decisions. We determine that cognitive adaptability/flexibility, counterfactual thinking, optimism, risk-taking propensity, self-regulation, exploratory style, self-efficacy, entrepreneurial passion, and openness are the CAPS most related to pivots. Additionally, we found fear of failure, locus of control, overconfidence, over-optimism, psychological ownership, solution/product blind adherence, persistence bias, risk aversion, inertia, confirmation biases, failure-driven biases, and self-serving attribution as the biases most related to pivots (see Figure 12).

Figure 12 – Cognitive-affective attributes and biases that affect pivot decisions



Source: created by the author.

3.3 CHAPTER SUMMARY

The examination of the existent literature addressing pivoting yielded five main findings. First, there is a growing interest in topics related to pivots in startups; this is evidenced by the growing number of publications on the subject and the predominant use of qualitative research. However, many aspects remain unexplored. Second, scholars, when setting explicit

definitions of the pivot, have adopted different conceptualizations of the pivot decision: a type of change, a type of a strategic decision, a mechanism related to correction or replacement, a process, or an event, and a state. It is worth highlighting that much research uses the concept of 'pivot' without explicitly defining it. Third, a large majority of the authors approach the pivot as a process that entrepreneurs engage in to address challenging situations, such as poor customer traction, cost overruns, or technological limitations. Fourth, the pivot decision is critical for three reasons: (a) pivot decisions involve substantial risk and investment, which can, in turn, determine the startup's direction and fate; (b) pivot decisions are linked with the entrepreneur's beliefs, self-perceptions, and other cognitive aspects; and (c) pivot decisions can undermine the firm's relationships with its key stakeholders, consequently affecting its access to critical resources. Fifth and finally, current scholarship uses a proliferation of meanings and labels concerning the pivot decision. We found that scholars not only adopted different components of the pivot definition but also focused on different dimensions of the phenomenon (e.g., cognitive aspects, staged process, and resources).

Building on previous studies and the contributions from the research streams (e.g., Marx & Hsu, 2015; Hampel et al., 2020), we propose a definition of pivoting as a strategic decision made after a failure (or the identification of a potential failure) of one or more elements of the current BM, which potentially threatens the startup's resource base. This decision may change the course of action, reconfigure the resource basis, and modify the OB and one or more elements of the BM. A pivot, therefore, refers to the concrete action of change that redirects the course of the startup.

Additionally, were identified the main CAPS and biases that may affect judgment during pivoting as described in Figure 12. These findings have implications for both practice and research. First, awareness of which CAPS and biases may be involved in a pivot decision can contribute to entrepreneurs improving such a critical decision. For instance, knowing that some biases can hinder the ability to objectively measure the performance of the new venture, the entrepreneur may opt to establish more accurate metrics or be more open to receiving advice in an attempt to lessen the negative effect of these biases. Similarly, they can attempt to strengthen their self-efficacy to diminish the rejection to change and enhance the recovery process from failure (Anglin et al., 2018; Arora et al., 2013; Uygur & Kim, 2016). Mentors and entrepreneurship professors can also advise their pupils about how cognitive elements (i.e., CAPS and biases) may positively and negatively impact their decisions, particularly in situations of failure (or possible failure) in which entrepreneurs do not have much room for maneuver. Furthermore, this research deepens previous studies on traits and personal

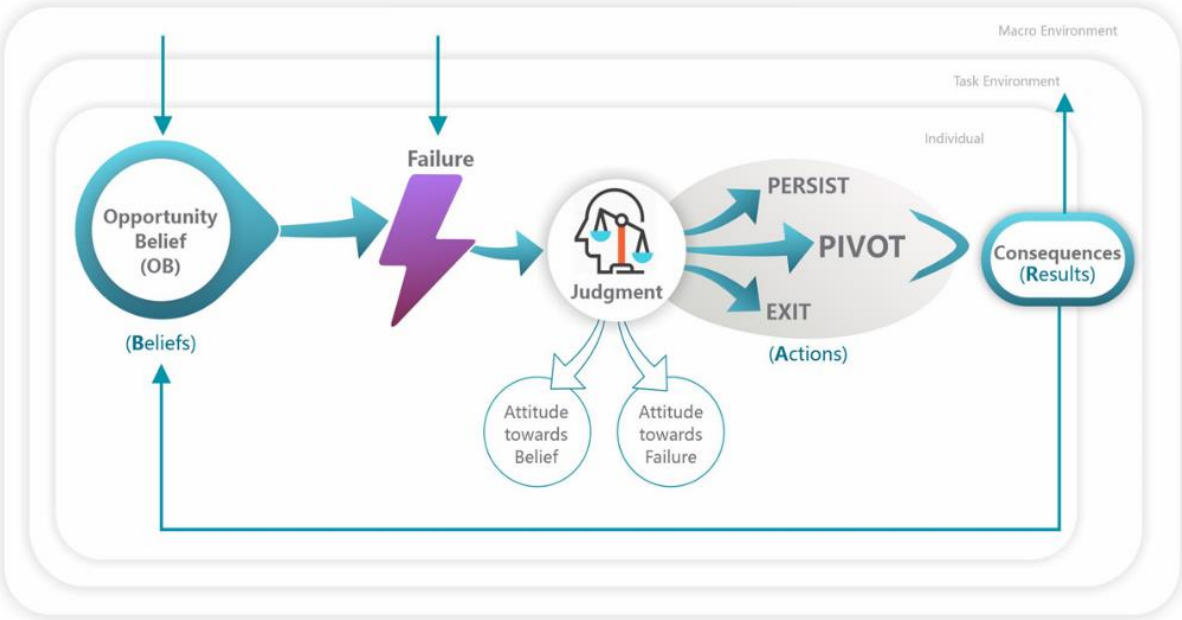
characteristics of entrepreneurs that affect decision-making processes (Baron, 2004; Zhang & Cueto, 2017).

The theories and concepts discussed in chapters two and three provided the theoretical foundations to build the conceptual framework for developing our empirical research on pivoting in startups. In the next section, we describe this conceptual framework.

3.4 PROPOSING A CONCEPTUAL FRAMEWORK FOR PIVOTING

From the literature explored in the theoretical background and SLRs, we built a conceptual framework (Figure 13) that aims to organize and connect the building blocks which may theoretically explain the rationality of pivoting decisions. The framework consists of five building blocks (beliefs, failure, judgment, actions, and results) embedded in three levels of analysis (macro-environment, task-environment, and individual).

Figure 13 – A Conceptual framework for Pivoting



Source: created by the author.

Together these elements and their relations aim to explain how the startup's course of action, which is driven by the OB, is pivoted after the effect of a failure and judgmental process. The course of action of a startup is determined by a set of beliefs regarding an entrepreneurial opportunity (i.e., OB) (McMullen, 2015). These beliefs guide the allocation of resources, formulation of the BM, and all the entrepreneurial acts during the entrepreneurial journey.

However, the entrepreneurial journey is often interrupted by failures (represented by the purple lightning in Figure 13) or deviations from expected results that conflict with past beliefs about the venture. Literature provides some examples of these failures: the emergence of a dominant technology that threats the firm's offering (Pillai et al., 2020), low customer traction (Bocken et al., 2016; Sońta-Drączkowska & Mrożewski, 2019), or an extremely narrow market niche (Hampel et al., 2020). The failures may involve actual events (that have already occurred) or potential events (that may occur). However, they indicate a discrepancy between beliefs and results: expectations are not being met.

This situation urges the entrepreneur to exercise judgment to subsequently decide between persisting (i.e., not altering the current course of action), desisting (i.e., stopping the course of action and exiting the venture), or pivoting (i.e., changing the course of action). Notwithstanding, the judgment in these cases would be influenced by two attitudes or responses to (1) past beliefs and (2) failures. The attitude towards belief refers to whether the entrepreneurs will regard the information derived from the failure to update their beliefs or disregard it and reinforce their existing beliefs. The attitude towards failure refers to, on the one hand, the dispositional and emotional response to the failure and, on the other hand, the perceptions and attributions to failure that will guide subsequent actions. For instance, the entrepreneurs can respond in a discouraging way (combined with emotions of sadness and grief) that leads them to give up, or they can respond with optimism and be motivated enough to look for ways to improve the situation.

Both attitudes will contribute to the entrepreneur's judgment in deciding whether to persist, pivot, or exit. These three options represent the possible actions that the entrepreneur can take in response to the failures, which to more or less extent, may alter the venture's course of action. These actions are then communicated to the stakeholders, and thereafter, resource reallocations, investments, and divestments are made. Moreover, the actions generate a series of consequences or results that can be measured (e.g., sales growth) and evaluated (e.g., positively or negatively) (Hastie, 2001). These results may, in turn, alter some aspects of the task-environment and the beliefs linked to the venture (as represented by the arrow connecting "consequences" and "task-environment" and "opportunity belief," respectively).

Finally, the framework proposes that the pivot decisions occur within the individual level but also may influence and be influenced by the task environment (i.e., the environment involving the startup's operations: internal and external) and macro-environment (i.e., the major context in which the startup is embedded: politics, economics, industry, etc.) (Foss et al., 2019). In other words, the OB and failures may be affected by changes in the macro and task

environment, for instance, demographic changes or new industry entrants. Likewise, some consequences of the pivot decisions may affect some aspects of the task environment, such as startup team composition or stakeholder networks.

The conceptual framework of pivoting decisions provides us the basis for proposing an alternative understanding of how pivoting occurs in startups. Moreover, it guides us to focus on the ‘judgment building block’ to explain better how entrepreneurs perform pivoting processes in their startups. The next chapter presents the methodological procedures adopted in performing our empirical research.

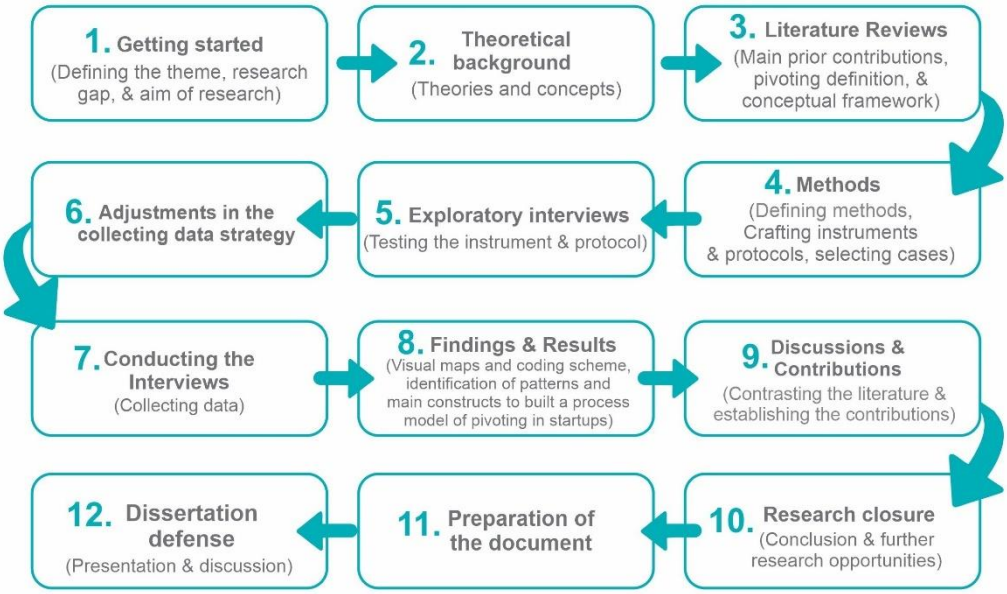
4 METHODOLOGY

This chapter describes the methods employed to conduct this research. It is organized into six sections: Section 4.1 describes the research design; section 4.2 presents the methodological approach; afterward, section 4.3 shows the case selection; section 4.4 describes the data collection process; section 4.5 shows the data analysis procedures; and finally, section 4.6 describes the quality and trustworthiness procedures.

4.1 RESEARCH DESIGN

Following the recommendations made by authors such as Langley and Truax (1994) and Yin (2018) on the importance of having a well-structured research process, we developed a research design structure presented in Figure 14.

Figure 14 – Research design structure



Source: created by the author.

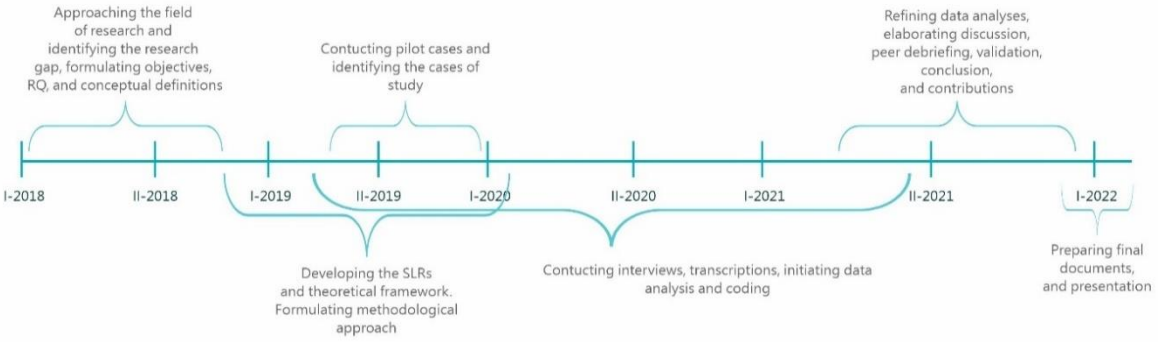
In step 1, we set the research theme and question; for this research, our research question is *how entrepreneurs perform pivoting processes in their startups*, and the unit of analysis is the pivoting decision. In step 2, we identified theories and concepts that may serve as a reference for our research. In step 3, we conducted the SLRs to identify the prior contributions, conceptualizations, and approaches for pivots. Based on this information, we proposed a definition of pivot decisions, identified the CAPS and biases involved in such

decisions, and built our conceptual framework based on these revisions and theoretical background. In step 4, we formulated our methodology strategy. This includes the methodological approach (qualitative research), research design, case selection, data collection strategy, and data analysis procedures. Then, we proceed to create the instruments and protocols for collecting data. Based on a search for new ventures that already have at least one pivot experience, we contacted some of those new ventures to conduct our research. In the exploratory interviews, in step 5, our objective was to know first-hand pivoting cases, validate our data collection strategy (protocols and instrument of interview), and identify the best strategy to approach the pivot phenomenon and gather the precise data for capturing the contextual and individual aspects as in-depth as possible.

In step 6, we adjusted our instrument and prepared an enhanced data collection strategy to conduct the second round of interviews. In step 7, we conducted the interviews focusing on the specific pivot decision and the entrepreneur's judgment, testing our initial framework, and collecting some other critical data. We adopted the strategy recommended by Eisenhardt (1989) and Merriam (2002) of overlapping data collection and analysis; still, in step 7, we started our analyses by organizing our information (field notes, recorded interviews, and secondary documents), transcribing the audios, and identifying main aspects. Following, we elaborated the first versions of visual maps and graphical representations of the data collected, focusing on the triggering events, the influencing factors, strategy to pivot, and consequences. In step 8, we refined the visual maps and continued with the coding analysis to identify new insights and underlying ideas from the interviews in order to create categories for building theory. Additionally, we described our findings and results and built a process model of pivoting in startups. The model was presented during two sessions of peer debriefing and three validating interviews with entrepreneurs in order to quality assurance and validity of the research. In step 9, we discussed our findings and contrasted them with the literature to establish our contributions. Afterward, in step 10, we concluded the research and identified the limitations and further research opportunities. Finally, in steps 11 and 12, we prepared the final document and presentation to defend the dissertation and close the study.

Figure 15 shows the research execution timeline schedule from 2018 to 2022.

Figure 15 – Research execution time-line



Source: created by the author.

In the next section, the basis for the selection of the methodological approach will be presented.

4.2 METHODOLOGICAL APPROACH

The primary aim of this thesis is to propose an alternative understanding of pivoting in startups and provide empirical evidence about how entrepreneurs perform pivoting processes in their startups. The results of the conducted literature reviews indicate that current literature fails to adequately address the pivot decision in a way that covers several issues concerning the phenomenon. This finding suggests an intended contribution to theory development rather than theory testing. In doing so, and considering the type of research question, the number of contextual conditions, and individual aspects to be considered, qualitative research is appropriate (Creswell, 2014; Merriam, 2002; Yin, 2009). Eisenhardt et al. (2016) and Edmondson and Mcmanus (2007) highlight that qualitative research is useful for exploring complex constructs such as image, identity, paradox, perceptions, or self-perceptions that are difficult to measure, require contextual understanding, and usually are not available in archival sources. Moreover, Van Burg et al. (2020, p. 5) argue that qualitative research enables “to zoom in on the particularities of different cases to generate an in-depth understanding of crucial differences in activities and conditions, illuminating ways in which entrepreneurs can best deal with the circumstances presented.”

The qualitative perspective aims to provide an understanding of how phenomena occur and allows researchers to capture a wide range of details (Creswell, 2014). Merriam (2002) points out that an important characteristic of qualitative research is its inductive nature. In other words, theories and concepts emerged from the data gathered, differently from deductive approaches where prior theories or hypotheses are tested. Merriam (2002) and Yin (2009) state

that case studies are appropriate to obtain a deep insight into an ill-explained phenomenon and to study contemporary events. Therefore, we opted to conduct case studies. Langley and Royer (2006) define case study research as the study of one or more bounded cases in which researchers focus in detail and analyze its context. Several researchers noted that case studies are well suited to understand the decision-making process (Eisenhardt, 2007; Langley & Truax, 1994; Yin, 2009) and study the response of people in the event of failures and emergencies (Gralla et al., 2016; Williams & Shepherd, 2021). Moreover, by applying a logic of replication, case studies are enriched because this logic enables finding particularities and verifying commonalities that strengthen the conceptualization and theorization, and paves the way for future mainstream deductive research (Eisenhardt, 2007; Langley & Abdallah, 2011). Therefore, we employ a multiple-case study method.

Furthermore, considering our objective of understanding the underlying judgment logic of pivoting: i.e., how and why a number of events (failures, beliefs, actions) intertwine to lead to pivot or persist, following previous studies (e.g., Gralla et al., 2016; Reymen et al., 2015), we adopted a process research approach. Different from traditional styles of 'variance theorizing'—which is concerned with linking together variables and identifying relationships of dependence/independence, and moderation to explaining variance in outcomes—a 'process model' style is concerned with revealing "the mechanisms by which events and activities play out over time" (Cloutier & Langley, 2020, p. 2). Process approaches also facilitate capturing aspects related to temporality and change (how events evolve or terminate over time) (Abdallah et al., 2019) and human emotions and actions (Cloutier & Langley, 2020; van de Ven, 1992), two fundamental aspects that contribute largely to the understanding of the pivots.

Abdallah et al. (2019) identified four modes of performing process research: evolutionary process stories, performative process stories, narrative process stories, and toolkit-driven process stories (see Table 4). Each mode responds mainly to a specific goal. For instance, the *evolutionary mode* concentrates on explaining how and why an entity evolves over time. The *performative mode* is focused on identifying patterns of actions and events that unfold over time, yet focusing on specific chronological instances. The focus of the *narrative mode* is on people's stories themselves; in other words, it is concerned with unveiling a comprehensive narrative picture of a process or phenomenon. Finally, the *toolkit-based mode* is concerned with offering a 'process model' that aims to explain how a process occurs. The toolkit-based mode has received growing attention in prestigious journals such as the Academy of Management Journal and is primarily supported by rigorous data analysis that follows the Gioia method (see Gioia et al., 2013). Considering these aspects, we decided to perform a toolkit-based process

approach. Some articles that adopt this approach and serve as a reference in this research were Harrison and Rouse (2015) and Reymen et al. (2015).

Table 4 – Four modes of performing process research

	Evolutionary Process Stories	**Performative Process Stories**	**Narrative Process Stories**	**Toolkit-based Process Stories**
Ontology and epistemology	• Substantive worldview; ontology of being. • Focus on how entities change over time Strong temporality in both analysis and model	• Process worldview; ontology of becoming. Focus on how reality is brought into being in every moment • Underlying temporality	• Implied processual view. Focus on individuals' sensemaking of unfolding phenomena • Temporality implicitly woven into narratives	• No explicit reference to process ontology/ epistemology • Longitudinal data with strong temporal component
Empirical story	• Chronology and phases as main analytical features. No or very limited detail of coding schemes in methods sections • Findings mainly presented by phases. Concepts and categories displayed subsequently or within phases	• Chronology and phases in the background Analysis of specific micro-interactions in the foreground. Large use of discourse or conversation analysis • Findings mainly presented by (discursive) practices. Large use of vignettes	• Findings structured around discursive sensemaking of an organizational phenomenon based on individuals' narratives	• Gioia-style methodological approach as a basis for theoretical model • Findings usually structured around model's dimensions (e.g., rather than temporal phases)
Theoretical story	• Linear or cyclical temporal flows in conceptual models • Model positioned within or after the findings	• Logical - rather than temporal - flows in conceptual models • Model positioned after the findings/ in discussion	• Theoretical model not always developed • Focus on tensions, links between narratives	• Models drawn from data coding structure • Model positioned before or after the findings
Specific challenges	• How to perform long-term data collection? • How to reach beyond description?	• How to reach beyond the local and specific? • How to sustain process ontology throughout the writing?	• How to reach beyond individuals' narratives? • How to build strong theoretical contributions from individuals' narratives?	• How to theorize process from progressive levels of abstraction? • How to achieve a creative leap?
Common challenges	• How to avoid imposing theory on data? • How to present multiple cases of temporally evolving phenomena?			

Source: Abdallah et al. (2019, p. 95)

4.3 CASE SELECTION

We use purposive, not random, sampling to select cases that fit case-study methodologies (Miles & Huberman, 1994) because we were primarily concerned about knowing various in-depth situations in which entrepreneurs decide to pivot. In the first instance, we selected ventures that have performed pivots. To ensure this condition, we conducted a preliminary search in secondary sources (i.e., websites, newspaper articles, official pages and social networks, blogs, or asking third parties who knew the startup) to identify whether the candidate firm made a pivot or not. Second, we selected ventures with a certain maturity, more specifically, with a minimum of two years of being founded. In a preliminary exploratory search to identify potential startups for our study, we identify that startups with less than two years of existence usually have not pivoted. This exploratory search inquired 24 founders and co-founders of startups during a business and entrepreneurship fair. When questioning why young ventures did not have pivoted yet, the participants explained that their ventures had not yet thoroughly explored the market or did not yet have an optimal version of their product or service.

Notwithstanding, we also included theoretical sampling after conducting the pilot case studies (i.e., case selection was guided by the emergence of new or potential theoretical insights; Eisenhardt, 2021; 1989). For instance, we realized that to gain a broader understanding of the pivot phenomenon, we should include some cases in which entrepreneurs initially persist despite identifying the failure or a potential failure before pivoting. Since this is a very difficult situation to identify a priori, we opted to conduct interviews with the founders, and after identifying the persistence situation, to deepen the case study with subsequent interviews. A total of five cases presented this situation.

An important point to be highlighted is that the case selection was also conditioned to the openness provided by the entrepreneurs. In other words, considering that narratives about failures “can be difficult to obtain because people are often reluctant to discuss failures” (Morais-Storz et al., 2020, p. 488), we leaned towards selecting those cases in which the entrepreneurs showed openness to share their experiences of failure and pivot in their startups.

Following Eisenhardt (2021), we employed the *common process* design in which the selected cases were involved in the same focal phenomenon yet operating in different settings. This feature is useful for improving generalizability or transferability. In this regard, we use cases from different sectors such as transport and logistics (e.g., Alpha, Andromeda, Helio, Ursa), data intelligence for business management (e.g., Sirius, Fornax, Draco), circular

economy (e.g., Columba, Vega), communications and advertising (e.g., Polaris, Pegasus), construction (e.g., Betelgeuse), health and wellness (e.g., North Start), among others. The startups of our sample also attend different markets (e.g., B2B or B2C) in different countries. Five startups are Colombian, eighteen Brazilian, and one British.

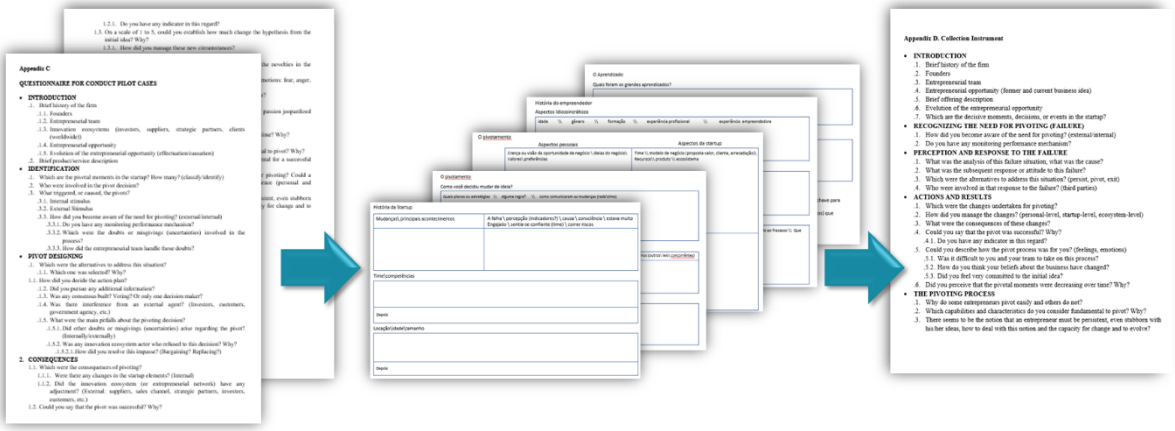
Using these criteria, we started searching for ventures in 2018 using social media like LinkedIn, specialized websites, attending entrepreneurship fairs, and our own connections. We obtained the acceptance to participate in the research from nine ventures contacted through LinkedIn, four using “cold” mailings, five through personal contact at trade fairs, and six via third connections like mutual acquaintances. This led to a final sample of 39 cases of pivoting in 24 startups. Startups in our sample were concerned with creating innovative, high-growth solutions. This characteristic is associated with a high level of uncertainty, mainly related to technology and the fact that the actuation market is not always clearly defined or well-established (Sussan & Acs, 2017). We had no personal or professional involvement with them. Table 5 provides a description of the selected cases (we used an ID for each startup and pseudonyms for founders to maintain anonymity).

4.4 DATA COLLECTION

Consistent with similar past studies (e.g., Reymen et al., 2015; Williams et al., 2020), we relied on primary and secondary sources of data to triangulate information. The data collected include: (a) semi-structured interviews with multiple respondents, including, among others, entrepreneurs, co-founders, and advisors, (b) internal documents provided by the entrepreneurs, and (c) archival materials including media and social media.

We began by consulting some archival material. We use Google and social media sites such as LinkedIn, Facebook, Twitter, and YouTube to find all material related to the history of the targeted startup and particularly interviews with the founders and co-founders. This information provides the basis for building up each case. Additionally, following Yin (2009), we carefully crafted the data collection instrument (see appendix D), a research brief to communicate our research objectives, and conducted two pilot cases to validate the data collection instrument. Our data collection instrument changed several times due to the emergence of new information from the pilot cases as well as the interaction with the literature. These variations are part of the process of readjustment of the data collection strategy. Figure 16 shows how the instrument has evolved.

Figure 16 – Evolution of the data collection instrument



Two-page questionnaire | Multi-page questionnaire in text-box format | One-page questionnaire

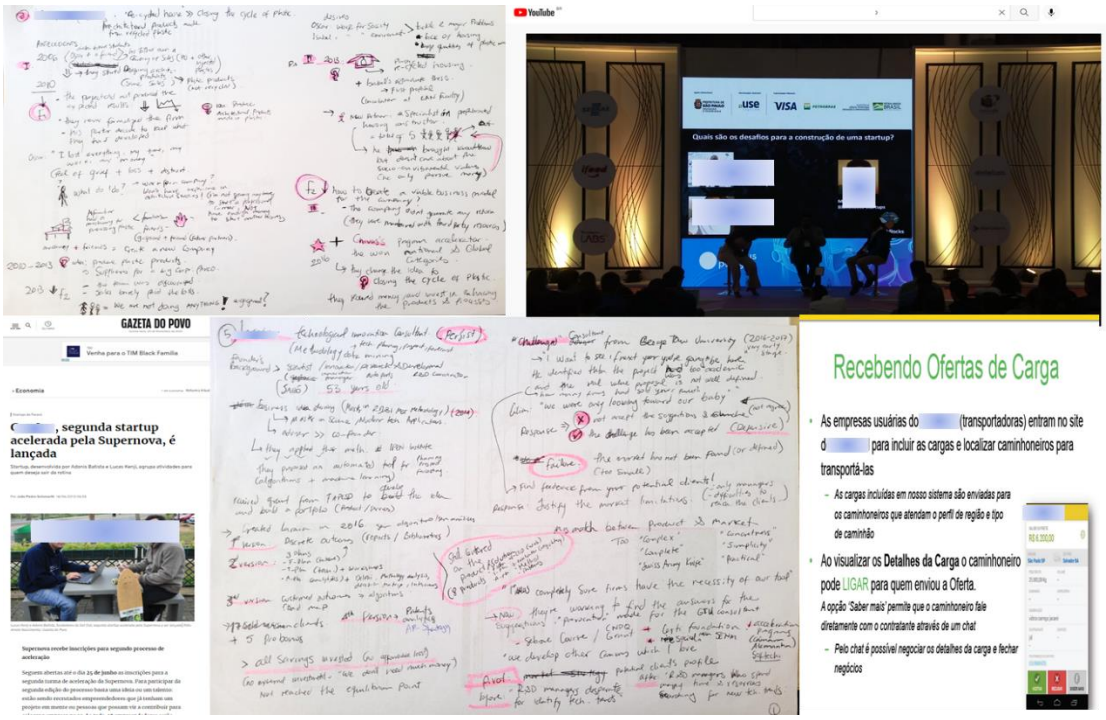
Source: created by the author.

The current version of the data collection instrument is based on the conceptual framework. The one-page questionnaire is structured into five sections. (1) introduction, which aimed to briefly know the startup's history, the founder, the product/service offered, and critical events. (2) recognition of the need for pivoting (failure) that aimed to identify how the entrepreneur realized the failure and the necessity to pivot. (3) perception and response to failure, in which we inquired about how the entrepreneurs analyze the failure (including its cause), what was the response to that situation, what the alternatives considered, and those involved. (4) actions and results, in which we intended to identify which changes were made for pivoting, what strategy was adopted to address pivots, whether there were resistances, and how the pivot affected the startup and the entrepreneur. Finally, (5) the pivoting process aimed to capture some general considerations about the pivots. For instance, why do some entrepreneurs pivot easily and others do not, what are the entrepreneur's characteristics to facilitate a pivot, feelings, and emotions involved, and the relationship between being stubborn and flexible within the entrepreneurship context.

As presented in detail in Table 5, a total of 50 interviews were conducted and supplemented with different secondary sources of data such as field notes, firm documents, firms' websites, press coverage, blogs, and video excerpts (see Figure 17). The interviews had an average duration of 54 minutes and were collected between April 2018 and October 2021. Each interview was preceded by a standard process of presenting the informed consent form, in which we inform the main topics to be addressed, the objectives, permission to record the interview, and the term of confidentiality (see Appendix E). In all the cases, we started with a founder or co-founder of the startup because they know the intricacies of the company's formation and pivots. Initially, we focused on surfacing the informants' experiences related to the creation of the venture, the evolution of their businesses

to that date, and another general background. Then, we delve into aspects such as key decisions and events (including the pivots and failures), the situations that led to a failure or a potential failure, the involved actors during the pivots, the undertaken actions after pivots, and the within-person aspects (i.e., beliefs, feelings, perceptions) experienced during the pivot decision. At the end of the interviews, we asked if we could contact the informant again to resolve any future doubts and if he or she could connect us with others involved in the pivot decisions. In this way, we conducted additional interviews with other informants involved in pivot decisions.

Figure 17 – Examples of field notes, firm documents, and other data from secondary sources



Source: created by the author.

In order to maintain consistency, all interviews were conducted by the author of this research. Considering that some of the interviewees were located in different countries and the pandemic situation of COVID-19, most of the interviews (40) were conducted through video calls via applications such as WhatsApp or Google Meets. Data collection was concluded when we achieved theoretical saturation. In other words, when new data no longer provide new insights and thus, no new patterns would emerge (Glaser & Strauss, 1967). The interviews were conducted in Portuguese and Spanish. All audio recordings were transcribed verbatim and encoded in the original language. However, in the presentation of the results, the main passages have been translated into English.

The data analysis procedures are presented below.

Table 5 – List of interviews conducted

							Secondary sources		
Startup (ID)	**Description**	**No. Pivots**	**Interviewed**	**No. of interviews**	**Data**	**Length**	**Internal docs.**	**Web sites**	**Press articles**
Alpha	Online travel agency	1	Co-founder (Bill)	1	13/03/2020	(48'')		3	1
Andromeda	A delivery solutions startup	1	Founder (Jim)	1	16/04/2020	(56'')		1	
Antares	Startup specialized in the treatment of oil contamination from biopolymers solutions.	2	Founder (Danilo)	1	24/03/2020	(45'')		3	3
Aquila	Startup specialized in intelligent energy monitoring (IoT) services and energy management based on Big Data.	1	co-Founder (Sixto)	2	05/03/2021 13/05/2021	(92'') (54'')		6	2
Beta	Startup specialized in the management of discount coupons and promotions	3	Co-Founder (Lina)	2	05/05/2019 26/11/2019	(42'') (67'')		12	5
Betelgeuse	Startup oriented to the management of loyalty programs in the construction sector	1	CEO (Adal)	3	13/12/2019 05/06/2020 26/01/2021	(52'') (56'') (36'')		7	4
			Busines Developer (Ana)	1	6/12/2020	(64'')			
			CTO (Hank)	1	13/05/2020	(60'')			
Canopus	Data-driven solutions company	1	Founder (Simon)	1	14/02/2020	(46'')		4	6
Carina	Food delivery company	1	co-Founder (Beto)	1	1/12/2020	(45'')		14	11
Centauri	Platform for vehicle repair and spare parts services	2	Co-founder (Bob)	2	06/07/2018 13/03/2020	(38'') (48'')	1	8	10
			Co-founder (Mario)	1	24/09/2020	(32'')			
Columba	Reverse logistics management company	1	Founder (Lucas)	1	23/03/2021	(56'')		3	5
Draco	Digital financial services company	1	co-Founder (Alan)	1	23/03/2021	(57'')		2	3
Fornax	Business services management company	2	Founder (Marco)	1	30/05/2020	(34'')		3	9
Helio	Logistics solutions company	1	Founder (Caio)	1	29/08/2019	(54'')	2	11	9
North Star	Photomedicine solutions company	2	Founder (Tim)	1	18/03/2020	(72'')		2	
Orion	Data intelligence and performance analysis firm	1	Founder (Bia)	4	29/10/2019 06/12/2019 21/02/2020 27/01/2021	(32'') (71'') (45'') (77'')	2	13	4
			co-Founder (Tom)	1	16/03/2020	(66'')			
Pegasus	DOOH solutions technology company	3	Founder (Nando)	1	23/03/2021	(89'')		4	6
Phoenix	Productivity email tool that applies the concept of Kanban	1	co-Founder (Bruna)	2	29/04/2021 11/05/2021	(60'') (47'')	1	7	9
Pleiades	Leisure activities planning firm	1	Founder (José)	2	10/3/2021 14/10/2021	(91'') (32'')		5	4
Polaris	Firm specialized in automating digital communication processes	4	Founder (Roger)	1	16/04/2018	(65'')		9	5
Pyxis	Digital privacy services company	2	Founder (Paul)	2	10/3/2021 14/10/2021	(91'') (28'')		5	4
Rigel	IT services support company	2	Founder (Thiago)	2	04/06/2019 20/09/2019	(42'') (37'')	5	11	9
			Infrastructure manager (Nick)	1	20/02/2019	(33'')			
Sirius	Intelligence and performance analysis platform	1	Founder (Joe)	7	15/02/2019 02/08/2019 12/08/2019 05/09/2019 06/03/2020 10/03/2020 27/10/2021	(32'') (70'') (73'') (61'') (39'') (40'') (34'')	6	12	5
			Co-Founder (Milton)	1	11/4/2020	(70'')			
			Former advisor (Jack)	1	16/04/2020	(56'')			
Ursa	Last mile delivery company	1	CTO (Ben)	1	13/03/2020	(30'')		3	4
Vega	An enabling company aimed to help plastic industries to close their production cycle by transforming recycled plastic into products for construction	3	Founder (Martin)	2	17/09/2019 19/11/2019	(38'') (40'')		8	17
TOTAL STARTUPS= 24	**TOTAL PIVOT DECISIONS=**	**39**	**TOTAL INTERVIEWS =**	**50**	**TOTAL TIME=**	**45':33''**	**17**	**156**	**135**
					Average length=	**54"**			

Source: created by the author.

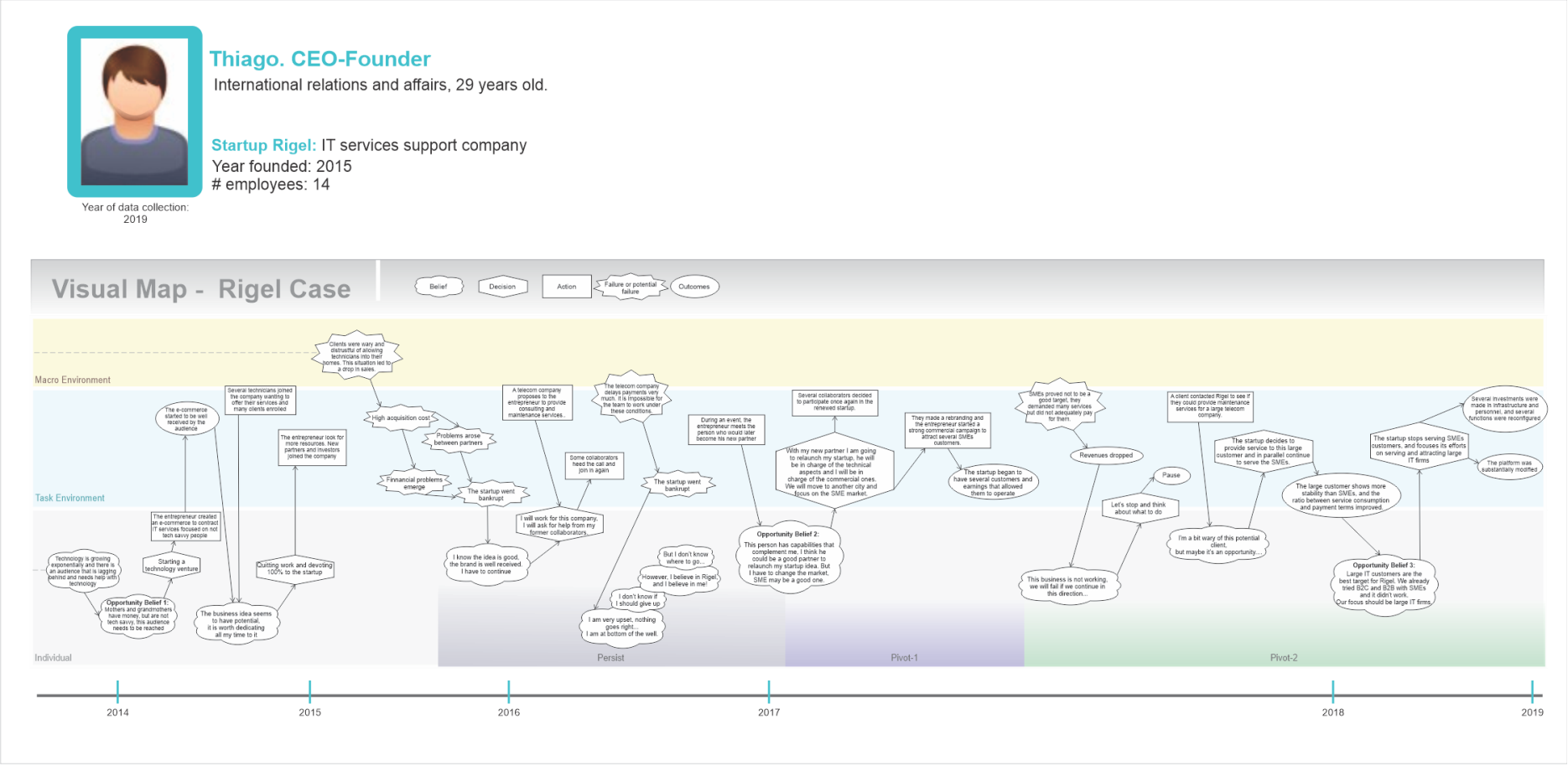
4.5 DATA ANALYSIS PROCEDURES

We analyzed the data employing an interactive and inductive approach as it is one of the most suitable for analyzing qualitative research (Patton, 2002; Strauss & Corbin, 1998). In accordance with Patton (2002), we will begin by creating the case records in which all the major information (including the data collected from primary and secondary sources) is consolidated in a single source. Since one major interest of qualitative studies is to provide the reader with in-depth insight and understanding of the cases studied in order to connect the findings to the raw data (Bizzi & Langley, 2012; Langley & Abdallah, 2011), we employed a processual approach based on visual mapping strategies (Langley, 1999; Pentland et al., 2020) combined with coding analyses (Corbin & Strauss, 2015; Gioia et al., 2013).

Visual Mapping Strategies

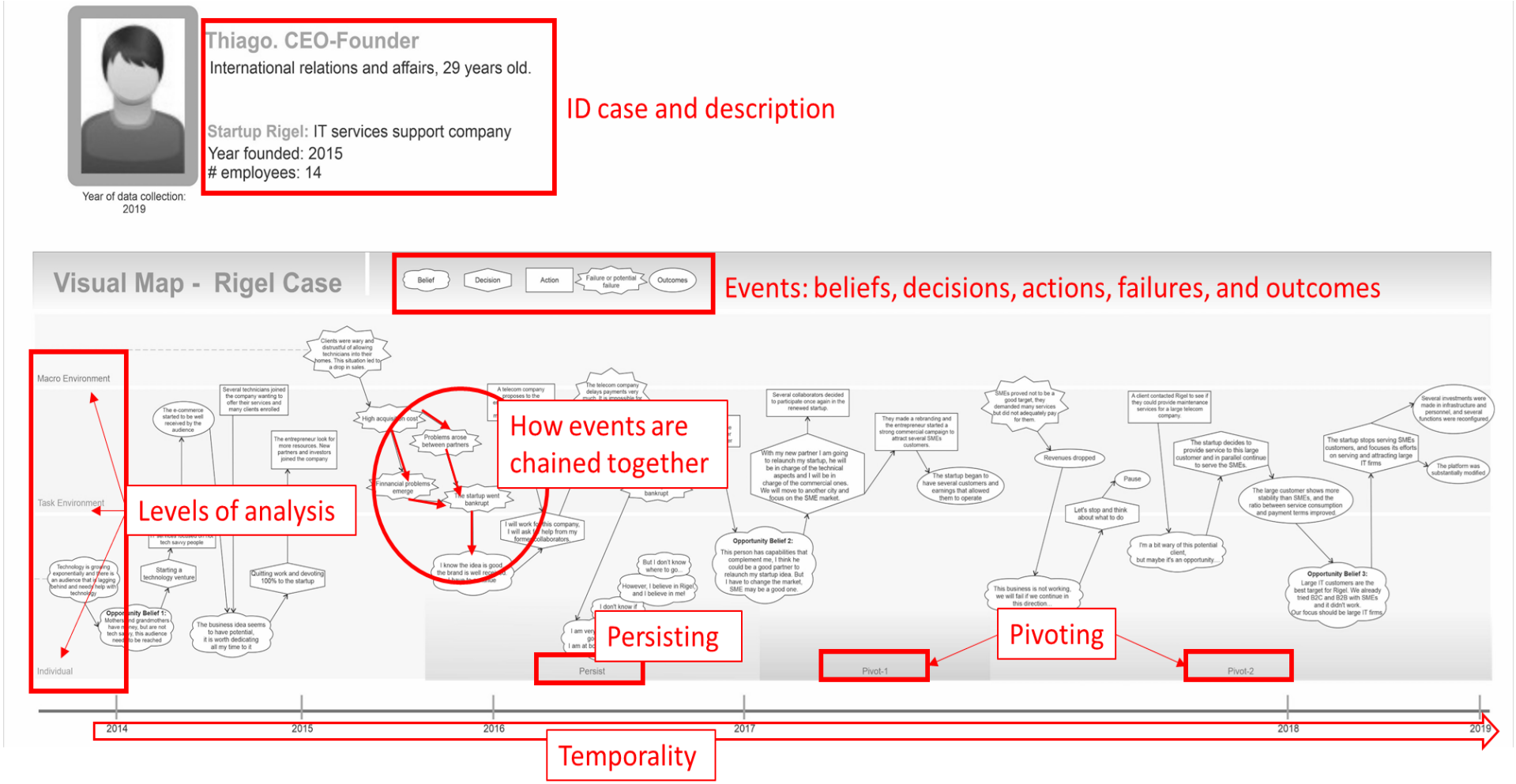
According to Langley (1999), the visual mapping strategy aims to identify patterns and abstract the main characteristics of a certain process. This strategy uses graphical frameworks for the analyses, allowing the representation of various elements at the same time, including the antecedent and subsequent events, parallel process, and temporariness. Langley (1999, p. 707) suggests that "visual maps can serve as intermediary data-bases for the identification of phases." Although it is not a very accurate strategy (moderate levels of accuracy according to Langley, 1999), visual mapping allows for organizing and synthesizing the events investigated. Following Langley and Truax (1994), we created 12 visual maps of the most emblematic cases or those that, because of their similarity to others, represented, to a large extent, different cases of pivots. Figure 18 shows the visual map of the case Rigel.

Figure 18 – Visual map of case Rigel



Source: created by the author.

Figure 19 – Description of the visual maps



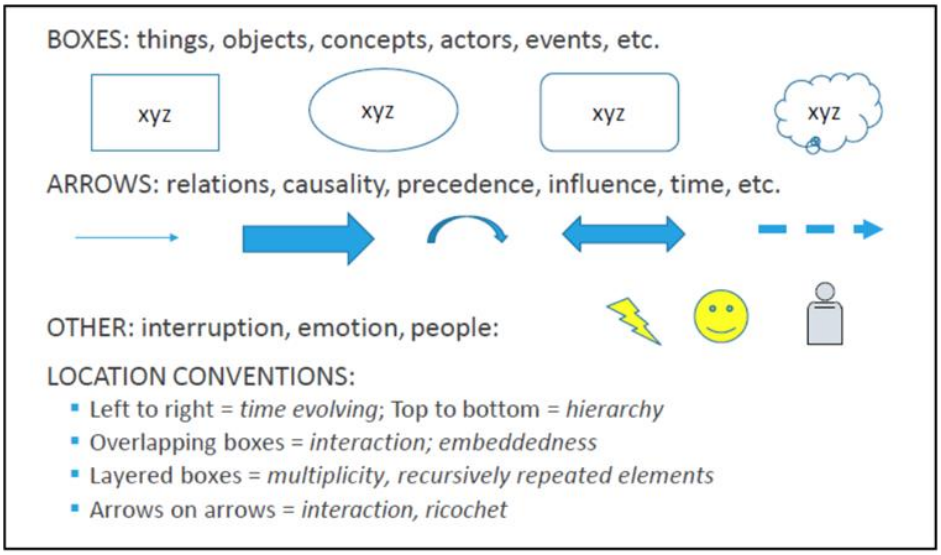
Source: created by the author.

To explain the visual maps, we have created Figure 19, which highlights the elements that constitute the maps. In the upper left corner, the visual map contains the ID case and description and a brief description of the informant. The main part of the map body contains the series of events that occurred during the pivoting decisions. The events are classified into five groups, each represented by a type of figure: beliefs (cloud shape), decisions (diamond shape), actions (rectangle shape), failures (explosion shape), and outcomes (oval shape). The representation of how these events are chained together is given by the arrows that link them. Plotting these linkages enables us to understand how a number of events intertwine to lead to pivots. For instance, in Figure 19, a reader can observe how failures influence the beliefs of the entrepreneur, which in turn make decisions that produce actions and outcomes. Additionally, the events are plotted in three horizontal stripes representing the levels of analysis identified in the conceptual framework (Figure 6): Macro environment (events occurring within the major context in which the startup is embedded: politics, social, industry, etc.), task environment (events occurring within the environment involving the startup's operations: internal and external), and individual level (events occurring within the informant's mind). The particular events directly linked to key decisions (i.e., to persist or pivot) are also highlighted by vertical and colored stripes. Finally, at the bottom of the map, a timeline displays the temporality and sequence of the events.

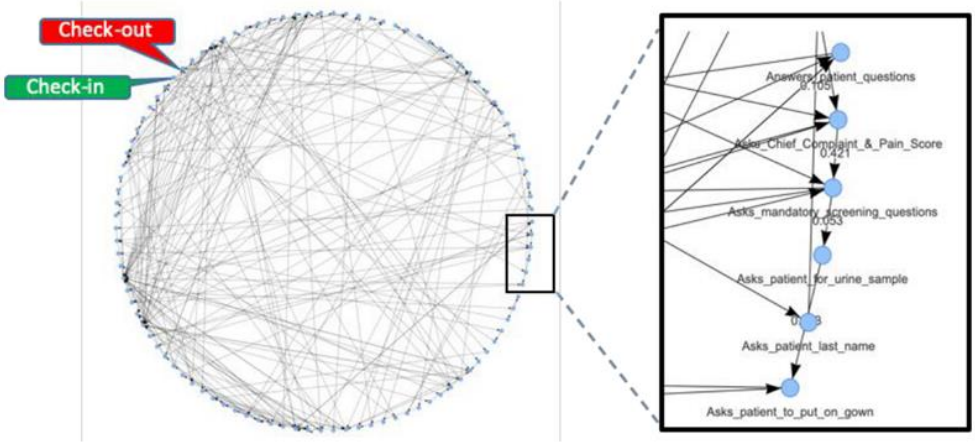
Visual maps are useful tools that enable the identification of critical events linked to the pivot decision in chronological order and describe the cases in detail (Langley, 1999). However, given the relatively large number of pivots analyzed (39), cross-case comparisons are difficult from these complex visual maps since they comprise abundant elements. To counter this situation and heeding the call of authors such as Langley and Ravasi (2019) and Pentland et al. (2020) to bring novelty to data coding using visual forms, we employed another visual strategy: multiplicity maps. Multiplicity maps are visual tools that represent the multiple pathways and outcomes of a given process (Cloutier & Langley, 2020; Pentland et al., 2020). According to Pentland et al. (2020, p. 2), a process—i.e., a chain of sequentially related events unfolding over time— "is simultaneously one thing (a single sequence of actions) and many (possible paths)." Contrary to the traditional definition of a process in organizational studies that imply a singular series of actions that has a singular outcome (leading to a traditional process representation of "black boxes"), Pentland et al. (2020, p. 9) argue that "every process is a multiplicity." Therefore, it is required that visual representations of processes provide a relational perspective between the events and the multiple relationships and outcomes involved.

For this purpose, Langley and Ravasi (2019) and Pentland et al. (2020) bring several examples and visual artifacts (such as figures, symbols, or conventions) that enable researchers to move beyond the conventional "black boxes" so often object of criticism (Eisenhardt, 2021; Pentland et al., 2020). Figure 20 exhibits some of these examples.

Figure 20 – Examples of alternative processes visual representations



"The Conventional Repertoire of Visual Representations", Langley and Ravasi (2019, p. 7)

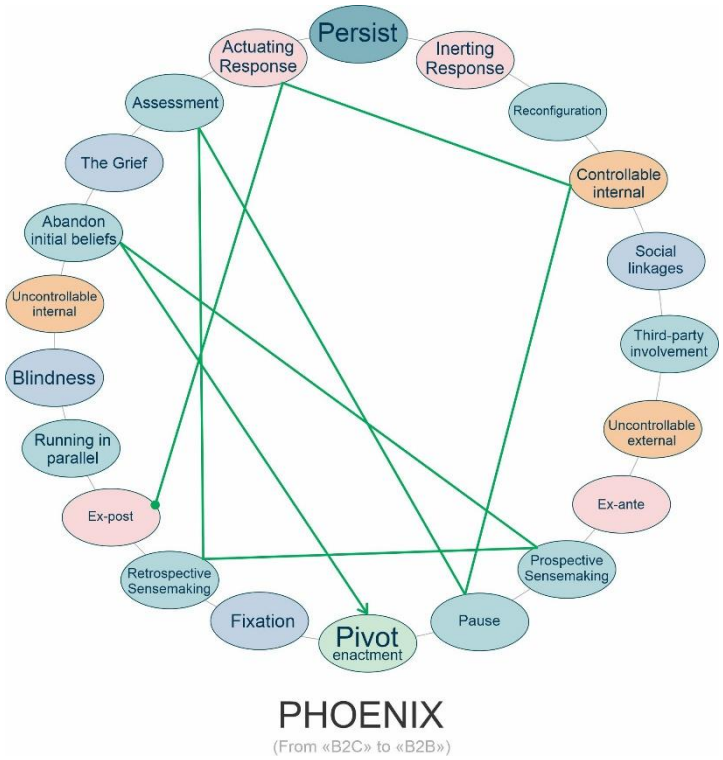


"Narrative network for patient visits", Pentland et al. (2020, p. 19)

Source: Langley and Ravasi (2019, p. 7) and Pentland et al. (2020, p. 19)

Based on the examples in Figure 20, we create a form of multiplicity map for representing each pivoting process studied. Figure 21 shows an example of the multiplicity map of the Phoenix case. The ovals indicate the events that occurred during the pivoting, which were identified in the visual maps and coding process. The lines show the pathways of these events. The starting point is signaled by the dot and the end by the arrowhead.

Figure 21 – Multiplicity map of Phoenix case



Source: created by the author.

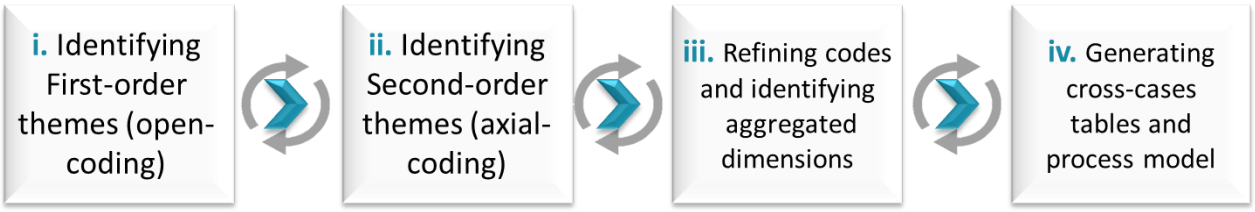
Coding Analyses

The coding analyses blend grounded theory and case study logic. They enable the identification of the categories, subcategories, dimensions, and properties, ultimately revealing the "core categories" on which the theory is generated or elaborated (Corbin & Strauss, 1990). For instance, the influence of how failures are identified and interpreted on pivoting or persisting. According to Langley (1999), coding analyses appear to be effective for analyzing processes and decisions from an in-detailed perspective and in a particular time span. Therefore, by combining visual mapping strategies and coding analyses, we were able to build robust research that enables us to better understand the phenomenon of pivot decisions.

According to Corbin and Strauss (1990, p.12), the coding approach refers to "the interpretive process by which data are broken down analytically," and its purpose is to identify new insights and underlying ideas "by breaking through standard ways of thinking about or interpreting phenomena reflected in the data." Following Patvardhan et al. (2015), Corbin and Strauss (1990), and Patton (2002), we structured the coding approach (Figure 22) into four interactive stages: i. identifying first-order themes (or open-coding), ii. identifying second-order themes (or axial-coding), iii. refining codes and identifying aggregated dimensions, and iv.

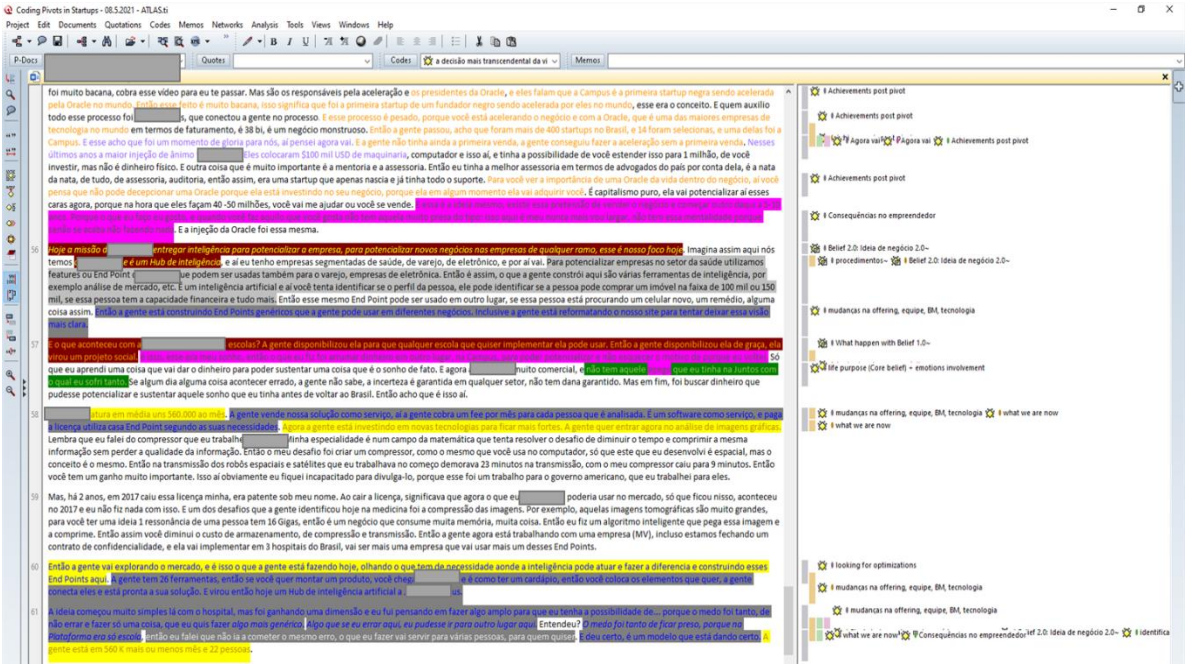
generating cross-case tables and a data-grounded process model. The transcripts were imported into ATLAS.TI®, a qualitative data analysis software that enables the iterative coding processes (see Figure 23).

Figure 22 – Coding analyses



Source: created by the author.

Figure 23 – Open coding



Source: created by the author from Atlas.ti software.

During the first stage, we identified the first-order codes or themes by reviewing the case records and analyzing the visual maps in order to identify the thought units—i.e., "words, lines, or passages that represented a fundamental idea or concept" (Patvardhan et al., 2015, p. 411). In open coding, events, characteristics, and actions are compared among the cases aiming to identify patterns (e.g., similarities or differences). These patterns are provided by conceptual labels and grouped together (Corbin & Strauss, 1990). As suggested by Miles and Huberman (1994), we created a list of code labels and definitions. Furthermore, similarly to Gioia et al. (2013) and Gomes et al. (2020), we adopted an iterative coding process in which codes were

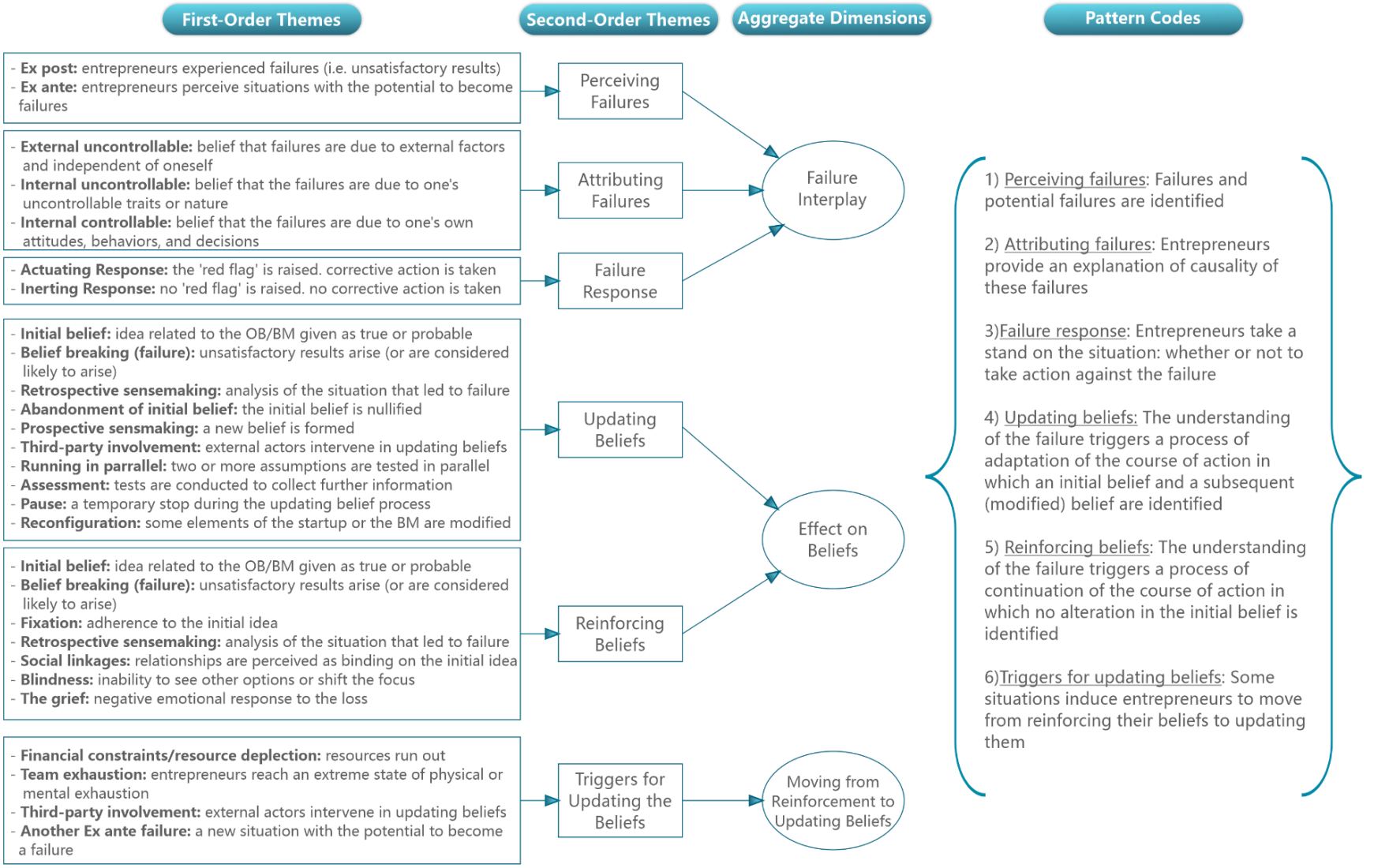
continually compared and assessed to avoid overlapping. Moreover, in this way, we were also able to search the core codes (i.e., the codes that are most inherent to the pivots) that will contribute the most to a better understanding of pivot decisions.

The first coding iteration resulted in 108 initial concepts from transcripts and secondary data. In this first coding round, the objective was to identify a wide range of emerging concepts to capture the main events, actors, beliefs, and outcomes of the pivoting decisions. These initial concepts covered different topics, such as the interpretation of failure situations, the involvement of third parties in pivot decisions, and the transformation of business-related ideas during the entrepreneurial journey. For instance, informant statements such as: "Besides that, we hired two other developers, and one person to help me in the commercial area" were coded under the label "reconfiguration." After several iterative coding cycles, the analysis and the number of codes stabilized on the first-order themes presented in the coding structure (Figure 24).

The axial-coding stage (ii) sought to discover how the groups of codes were related. Then we clustered them into axis or high-order themes by linking the code groups "at the level of properties and dimensions" (Strauss & Corbin, 1998, p. 123). The goal at this stage was to identify more aggregated and precise themes that better complete the explanations of the pivot phenomenon. During the refining process of codes, we held several sessions among the authors and a couple of times with other external researchers unfamiliar with the study to discuss our observations. In parallel, we compared and contrasted the cases by emphasizing the evolution of the pivots over time (Langley, 1999). Our findings unveiled that pivoting is not a linear process, nor does it occur in the same way in all startups. Notably, we observed that in five cases (i.e., Orion, Pleiades, Rigel 1, Sirius, and Ursa), entrepreneurs preferred to persist initially in a failed course of action before pivoting to a new one. This significant fact led us to focus even more on explaining these two different trajectories and, in particular, identifying the mechanisms behind these choices. In comparing the data in this way, we resolved to categorize our initial codes into six second-order themes labeled: "Perceiving failures," "Attributing failures," "Failure response," "Updating beliefs," "Reinforcing beliefs," and "Triggers for updating the beliefs."

At this point, we built up the coding structure (Figure 24) that guides and allows visualizing our analysis process in a simple way. The figure also contains the pattern codes, i.e., the patterns that reflect the relationships between the coded categories (Catino & Patriotta, 2013), to better explain how the codes were identified from the raw data.

Figure 24 – Coding structure



Source: created by the author

In stage iii, the second-order themes were refined and distilled into aggregate dimensions. At this point, we followed the principle suggested by Patton (2002), on which the categories should obey two criteria. First, internal homogeneity, i.e., codes belonging to the same category, must refer to the same meaning. And second, external heterogeneity, i.e., differences between categories, need to be bold and clear. According to Corbin and Strauss (1990), during this stage, all themes are unified around core categories that are also skimmed in order to leave only the most enriching ones.

In stage iv, we developed comparison tables and a data-grounded model. To this end, we based on the inductive analysis method developed by Eisenhardt and colleagues (e.g., Eisenhardt et al., 2016; Hannah & Eisenhardt, 2018; Ott & Eisenhardt, 2020; Santos & Eisenhardt, 2009). According to Eisenhardt et al. (2016), comparison tables such as construct tables are useful to summarize the evidence that supports a given construct or theme. Likewise, other authors (e.g., Czarniawska, 1998; Saldaña, 2015) suggest creating vignette tables which are narrative analytical tools well-suited to contextualize and make cross-cases analyses. Table 6 presents the change efforts identified by Heinze and Weber (2016) in healthcare organizations. The vignettes reconstructed the event sequences of two programs (blue and red) and helped to compare patterns in these sequences.

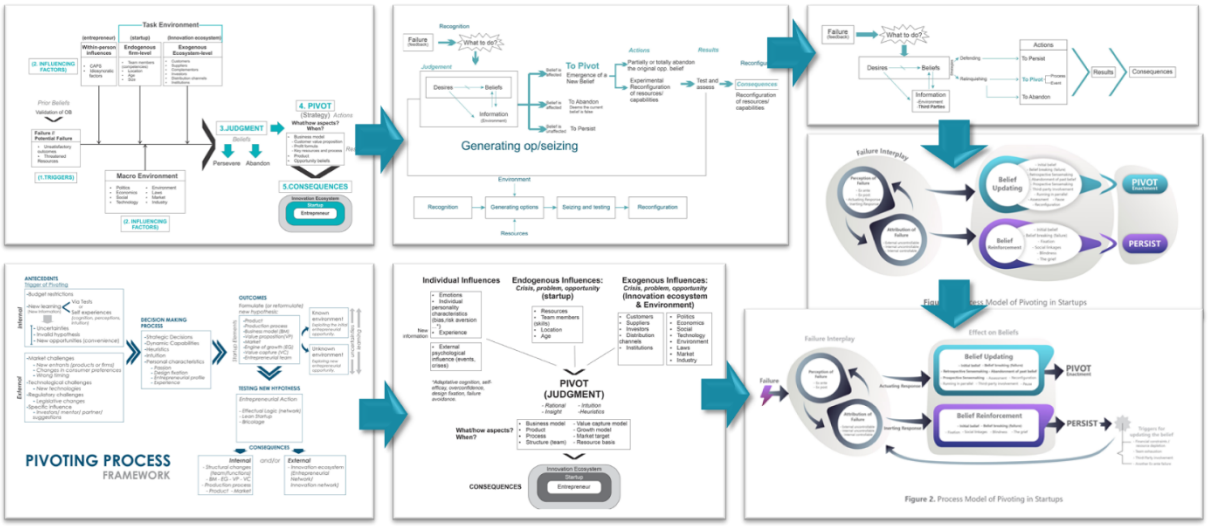
Table 6 – Example of vignettes table

			Tactics Used				
ID	**Site**	**Description**	**Status**	**Juris. Resource**	**Trading Spaces**	**Pipeline**	**Exper.**
B1	Blue	Developing IM Medical School Course					x
B2	Blue	Inserting IM Content into Med School Curriculum					x
B3	Blue	Forming IM Medical Student Curriculum		x			x
B4	Blue	Forming Integrative Medicine Program	x	x			
B5	Blue	Losing Integrative Medicine Courses		lack of		lack of	
B6	Blue	Forming Faculty Education Program		x		x	x
B7	Blue	Managing Membership of IM Board			x	x	
B8	Blue	Building Support for the IM Program			x		
B9	Blue	Recruiting, Training Course Facilitators			x	x	
B10	Blue	Securing Grants	x	x			
B11	Blue	Managing Success of IM Clinic		x	x		
R1	Red	Proposing Integrative Medicine Program	x	x			
R2	Red	Creating Integrative Residency Curriculum				x	x
R3	Red	Opening Grand Rounds and Outreach Education			x		
R4	Red	Forming of IM Fellowship				x	
R5	Red	Forming and Growing Mindfulness Program	x	x			
R6	Red	Forming Massage Clinical Services		x			
R7	Red	Formation of Integrative Medicine Program	x	x			
R8	Red	Recruiting Supporters Within the Healthsystem		x	x		
R9	Red	Recruiting Community Practitioners			x	x	
R10	Red	Growing the Integrative Medicine Program		x			x
R11	Red	Expanding the IM Clinic		x			x
R12	Red	Managing Timing of Change	x		x		
R13	Red	Securing Grants	x	x			

Source: Heinze and Weber (2015, Online Appendix, p. 5).

In order to develop the data-grounded model, we built on previous studies (e.g., Miles & Huberman, 1994; Patvardhan et al., 2015; Patvardhan & Ramachandran, 2020) in which the codes, categories, and their relationships are displayed in a framework. This framework has suffered several adjustments during the course of this doctoral thesis, as shown in Figure 25.

Figure 25 – Evolution of the data-grounded model



Source: created by the author.

4.6 QUALITY AND TRUSTWORTHINESS

In order to ensure the quality and trustworthiness of our data analysis, we follow a number of suggestions in the literature (e.g., Lincoln & Guba, 2000; Morrow, 2005; Yin, 2018). First, in terms of *credibiliy*, which refers to the idea of a rigorous research process and internal consistency (Morrow, 2005), we offered rich contextual information and thick case descriptions backed up with visual maps. We also detailed methods, procedures, and findings report showing which rationale was applied in the data analysis (Yin, 2018). Moreover, we consulted several sources of information and different informants to triangulate the data for each case, thus minimizing the risk of biasing the research outcomes.

Second, we took a number of steps to ensure *transferability*, or "the extent to which the reader is able to generalize the findings" (Morrow, 2005, p. 252). For example, we used the replication logic (Yin, 2018) by studying multiple pivot cases (39 in total). This, coupled with the fact that startups selected operate in different countries, sectors, and markets, enabled us to gather an eclectic database to analyze the pivot phenomenon in a more comprehensive way. We also employed the mapping tool available in the software Atlas.TI to assist in the refining

coding process. In this way, we clearly identified redundancies and inconsistencies among codes. For instance, we identified some codes that were not applicable for all cases, nor the majority of them. In such cases, the event, actor, or result was arguably more associated with some idiosyncratic aspect of the case or the entrepreneur and, although insightful, would not contribute to the identification of mechanisms that explain the pivot in startups more broadly.

Finally, to ensure *dependability* (which reflects whether the findings are reliable and consistent) and *confirmability* (that aims at objective research as far as possible), we held several peer debriefing sessions to gain an outsider perspective. A total of four peer debriefing sessions were conducted between August and October 2021. In these sessions, we engaged researchers not involved in the study but acting in the field of entrepreneurship and decision making. These researchers were invited to discuss our evolving findings and provide critical insights and questions that could improve the consistency and objectivity of our analytical procedures. Furthermore, once we obtained more concrete findings, we invited some entrepreneurs who participated in the study to conduct results-checking sessions (three in total). During these sessions, we introduced the research aim and context to the participants, presented the results (including the respective startup visual map), and discussed whether the findings reflected the events' reality and whether there were some important points to be considered and others to be disregarded. In general, the entrepreneurs stated that the results reflected reality and explained the logic of the pivots appropriately.

Both checking and peer debriefing sessions allowed us to confirm the dependability and consistency of our results. For instance, we checked three of the four pivot approaches we had originally identified. The fourth one was the "outsourcing-judgment approach," in which the entrepreneur "outsourced" or delegated the judgment of pivoting to a third party. In our initial round of coding, we identified that in some cases, the involvement of a third party was extremely crucial for the pivots to be made, and we precipitated the inference that in these cases, it was the third party who ultimately made the decision to pivot. However, when we presented these findings to entrepreneurs, we rapidly understood that although the role of the third party in such cases was quite important, it was always the entrepreneur or the entrepreneurial team who ultimately judged whether to pivot or not. Additionally, we asked some informants to verify our visual maps and improve some aspects that were not entirely clear.

The results of the data analysis procedures described in section 4.5 will be presented in the next two chapters. Chapter 5 shows the results of the visual mapping strategies that, together with the coding analyses, allowed us to identify patterns and abstract the main events on which we build our process model of pivoting in startups presented in chapter 6.

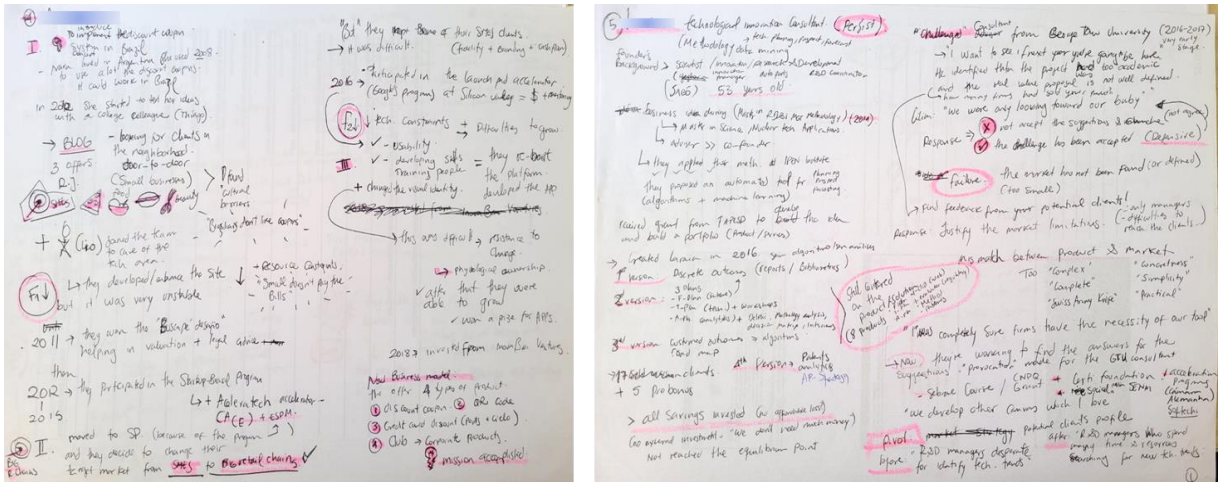
5 RESEARCH RESULTS: VISUAL MAPPING STRATEGIES

This chapter is structured into two sections. The first section presents the case description and visual maps that simultaneously represent various elements, including beliefs, decisions, actions, outcomes, and temporariness. The second section shows the multiplicity maps that aim to identify patterns and explain how a sequence of events is interchained and results in pivots. The results presented in this chapter enabled us to establish a more concrete sense of how each of the pivoting cases occurred. They also contributed to the identification of the central events and some patterns present in the pivots that provided the basis for the process model of pivoting in startups.

5.1 CASE DESCRIPTION: HOW A NUMBER OF EVENTS INTERTWINE TO LEAD TO PIVOT

We opted to combine visual maps and written descriptions to facilitate data reduction and start our analysis process (Miles & Huberman, 1994). In this process, following prior works (e.g., Gralla et al., 2016; Langley & Truax, 1994), we transformed a large amount of verbal data into graphical representations that enabled us to understand and communicate the sequence of events that resulted in pivots.

Figure 26 – Examples of handmade timelines



Source: created by the author.

The first step was to create rough handmade timelines for each startup after the interviews (Figure 26). When analyzing them, we noticed that some cases were more complex

than others and could offer further clues to understanding the pivots. Therefore, we decided to make an initial classification considering such complexity. The criteria for determining complexity across cases were: number of third parties (i.e., besides founders) involved in the decision to pivot, initial impediments to pivoting (e.g., the entrepreneur reported depressive situations that prevented them from seeing other solutions, fixation biases), number of new opportunity beliefs that were assessed prior to pivot, number of pivots, and number of identified failures.

Table 7 shows the initial classification of the pivoting cases into five groups of startups regarding their complexity (5 being the most complex cases and 1 the least complex).

Table 7 – Initial classification of the cases regarding their complexity

	Complexity				
	1	**2**	**3**	**4**	**5**
Startups	***Phoenix***	***Polaris***	***Beta***	***Rigel***	***Sirius***
	Canopus	***Aquila***	***Fornax***	***Pleiades***	***Centauri***
	Andromeda	Carina	***Vega***	Ursa	***Orion***
	Alpha	Columba	Pyxis		
	Betelgeuse		Pegasus		
	Antares				
	Helio				
	North Start				
	Draco				

Source: created by the author.

This initial classification gave us the starting point to determine how to delve into the cases. We then focused on those that were the most complex and would be representative of other cases. Thus, we selected 12 cases (boldface/italic startups' names in Table 7) to create visual maps (Figures 27 to 38) and thus graphically represent how pivoting occurs in the startups. As described in section 4.5, the maps comprise several intertwined elements (shapes, arrows, and stripes) that exhibit how a number of events (failures, beliefs, decisions, actions, and outcomes) chained together and resulted in pivots. The maps explain how the startups originated from an initial OB, which led to certain actions and outcomes that were affected by failures or other actions that altered the course of events.

As Langley and Truax (1994) pointed out, graphical representations are very useful as "an intermediate level of theorizing between the raw data and a more abstract and general process model" (p. 626-627). While developing the visual maps, we began to identify more concrete concepts that provided the basis for structuring our framework. For example, we identified how beliefs (shown in the 'individual' stripe in Figures 27 to 38) influenced decisions and how these decisions shaped certain actions and outcomes, which in turn affected beliefs.

The identification of this chain of events allowed us to systematically compare the cases, identify certain patterns (e.g., alterations in beliefs after a failure or the intervention of third parties to help the entrepreneur) and differences between the cases (e.g., between those in which the entrepreneurs persisted or those that pivoted more than once). Therefore, these maps became an expression of our emerging ideas about pivoting in startups.

To facilitate understanding of each case, we briefly describe them as follows.

5.1.1 Visual Maps and Case Descriptions

Sirius (Figure 27)*:* Sirius emerged as a startup to support students in Brazilian public schools in 2014. As shown in Figure 27, this initial belief was mainly influenced by Joe's personal interests in education and his aspiration to see himself as an entrepreneur. Joe spent part-time as the developer of the performance analytics platform, while his partner "A" was focused on sales. After the first sales, Joe decided to quit his job, return to Brazil, and devote 100% of his time to Sirius. However, very soon (by mid-2016), two major failures put the venture in check: signs of corruption in the school public sector—which was the initial Sirius's client—and significant financial constraints. Notwithstanding, Joe's first response was to persist in his initial opportunity belief. The entrepreneur manifested that at that time, he deeply trusted in his initial venture's beliefs and thought that the problem with the lack of sales lay in the platform. Therefore, his focus was on trying to enhance the technology since it was his professional domain. However, technology was not the underlying problem that impeded the startup from flourishing. Consequently, resources soon ran out, and even Joe's well-being began to be at risk, as he explains: "*There comes a moment when you have nowhere to run, there is no more bottom in the well. You get down there, you are alone because you created the business, and there is nowhere for you to run*."

Having depleted resources and going through a period of depression, in the middle of 2017, the entrepreneur considered abandoning the startup and trying to get a new job. At this point, Milton—a former angel investor—convinced Joe to reconsider his resolution and rather think about another BM (especially another type of client) in which the platform created could be utilized. After a short period of search, in 2018, Joe came up with the idea of applying his platform in the enterprises market, leaving behind the original business idea of serving public schools. Then, Joe finally decided to pivot Sirius. A series of reconfigurations were undertaken, including Milton's joining as co-founder, the expansion of the sales force, and some of the platform's features.

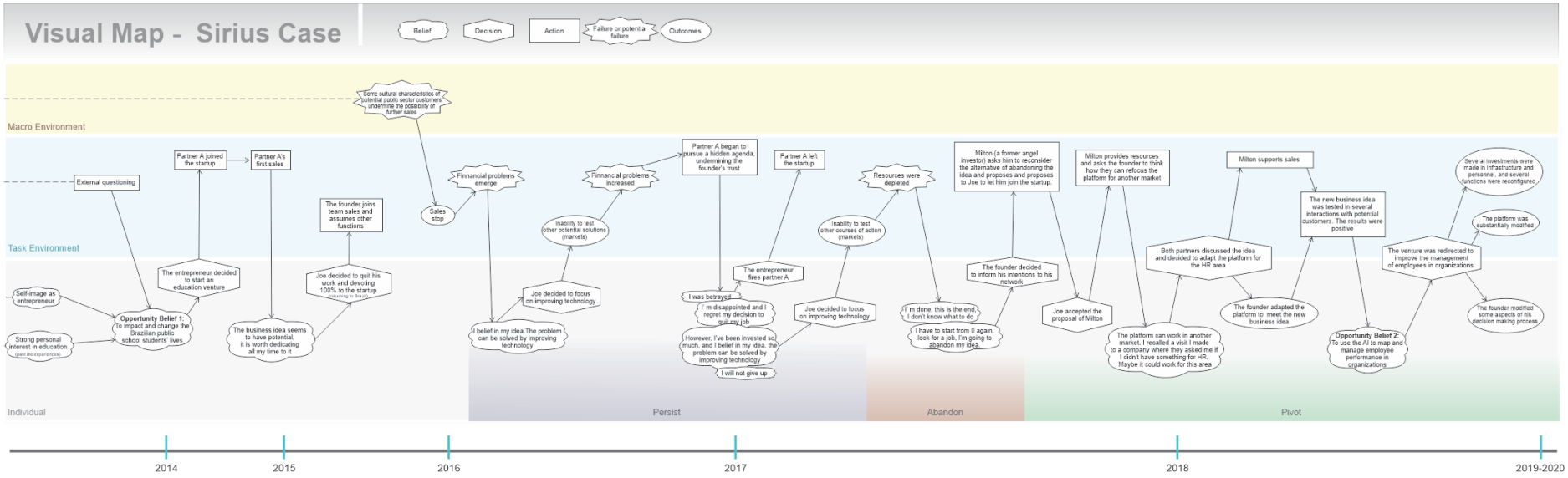
Figure 27 – Visual map case Sirius

Joe. CEO-Founder
Data scientist, 32 years old.

Startup Sirius: Intelligence and performance analysis platform
Year founded: 2014
employees: 22

Year of data collection:
2019-2020

Milton. Co-founder
Geographer, 68 years old.



Source: created by the author.

Figure 28 – Visual map case Orion

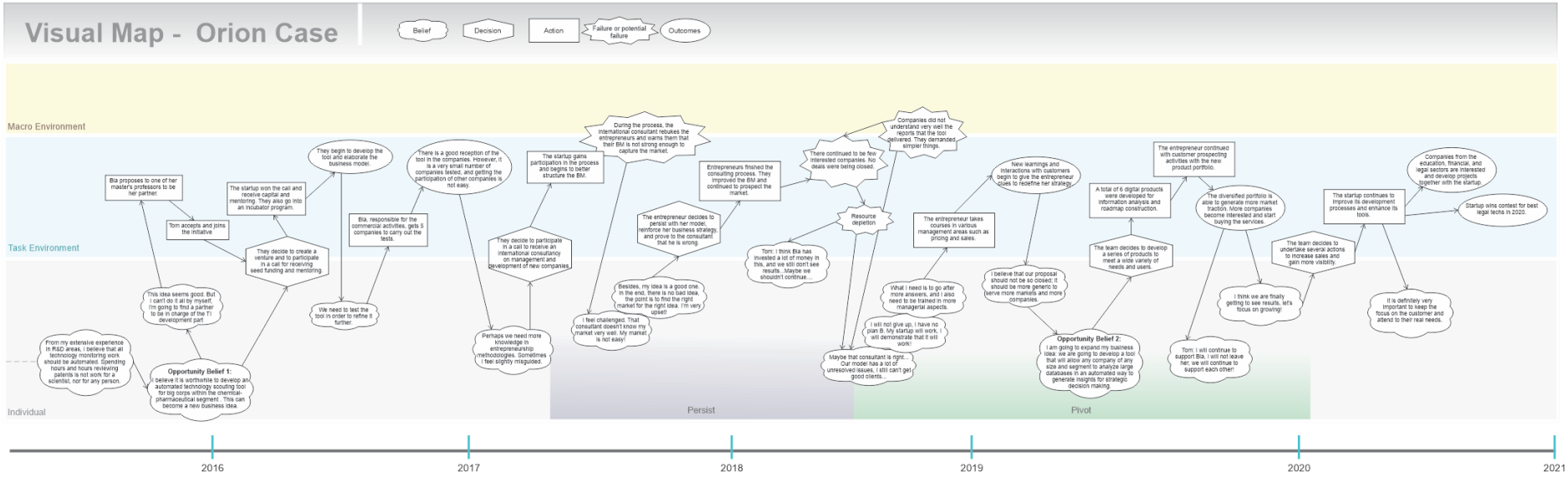
Bia. CEO-Founder
Chemical Engineering, 54 years old.

Startup Orion: Data intelligence and performance analysis firm
Year founded: 2016
employees: 6

Year of data collection:
2019-2021

Tom. Co-Founder
Mechanical Engineer, 66 years old.

Year of data collection:
2021



Source: created by the author.

Figure 29 – Visual map case Centauri

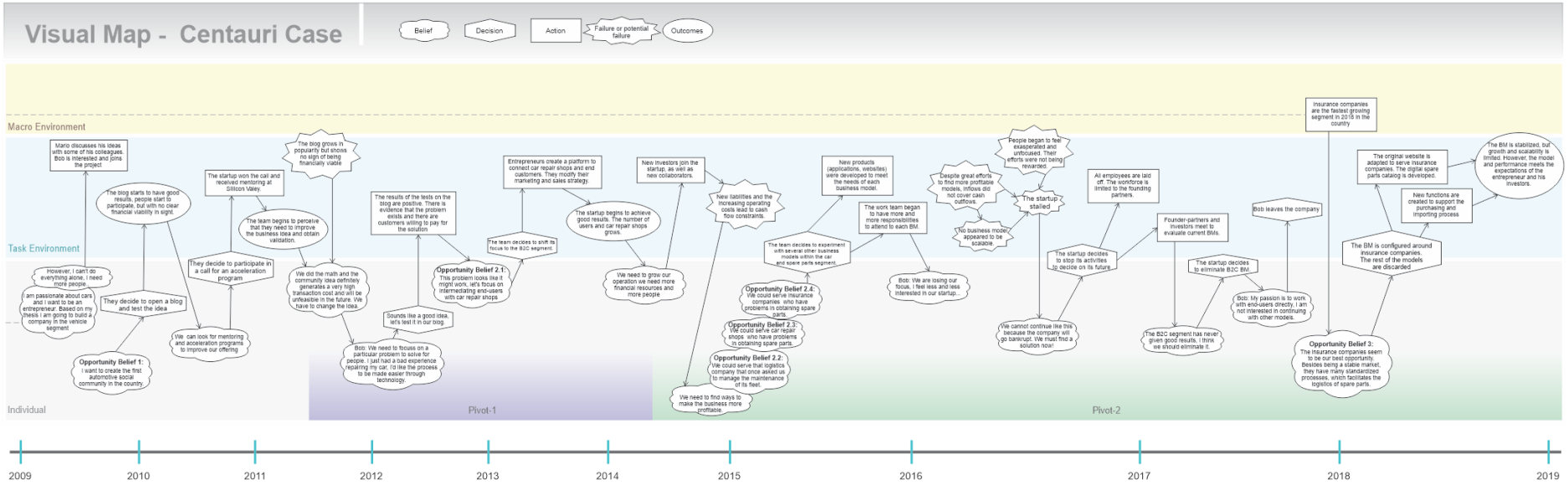
Mario. Co-Founder - CEO
Industrial Engineer, 37 years old.

Startup Centauri: Startup specialized in the management of discount coupons and promotions
Year founded: 2009
employees: 10

Year of data collection:
2020

Bob. Co-Founder - CTO
Software Engineer, 34 years old.

Year of data collection:
2018-2020



Source: created by the author.

Orion (Figure 28)*:* The startup was born in 2016 from the doctoral thesis of Bia, in which she and her colleague created a data intelligence platform for bibliometric analysis. After some market interactions during 2017, the startup entered into an accelerator program that invited some international consultants. One of them warned Bia that her model was not robust enough and that the business would no longer be sustainable in a short time. However, her immediate response was to assume the warning as a personal challenge; she commented: "*he challenged me, . . . I thought I would show him that it was not what he said*." Besides that, she mentioned that at the time, she believed that "*every business idea was a good one*," and its success would depend on the way it was executed. Therefore, Bia opted to persist, and the startup continued in the same way it was. However, even after considerable marketing and sales efforts, Orion could not establish regular customers and financial problems became unaffordable in the middle of 2018. That situation made Bia reconsider her positioning, so she decided to look after new possibilities (e.g., new markets, new products, and services) for her startup. After scrutinizing the scenario and receiving more training, the entrepreneur decided to pivot and broaden the firm's scope and provide a more generic value proposition.

Centauri (Figure 29): Centauri is one of the cases in which entrepreneurs pivoted twice. The startup initiated its operations in 2009 by Bob—who described himself as a "passionate about cars"—based on his graduate thesis. At the time, the business idea was linked to consulting services for firms in the automobile segment. Bob rapidly perceived the necessity of a partner, so he invited one of his colleagues to join the project. Together, the entrepreneurs built the first OB, which consisted of an automotive social network. To test this idea, they created a blog that was very well received by the general public. However, the entrepreneurs had not yet identified a way to make this idea financially viable. During this period, in 2011, Centauri participated in an acceleration program. They gained more entrepreneurial knowledge and held an event that considerably increased the blog's popularity but still did not achieve financial viability. At the end of that year, the entrepreneurs had a meeting, did some math, and decided that they should try to focus on one specific problem of their blog's audience. After some deliberation, the team came to the conclusion that they should focus on a new OB and creating a platform that connects users and auto repair shops. They tested this idea in their blog and concluded that it could be a good business model. Thus, at the beginning of 2013, they pivoted Centauri to a B2C marketplace for car repairs.

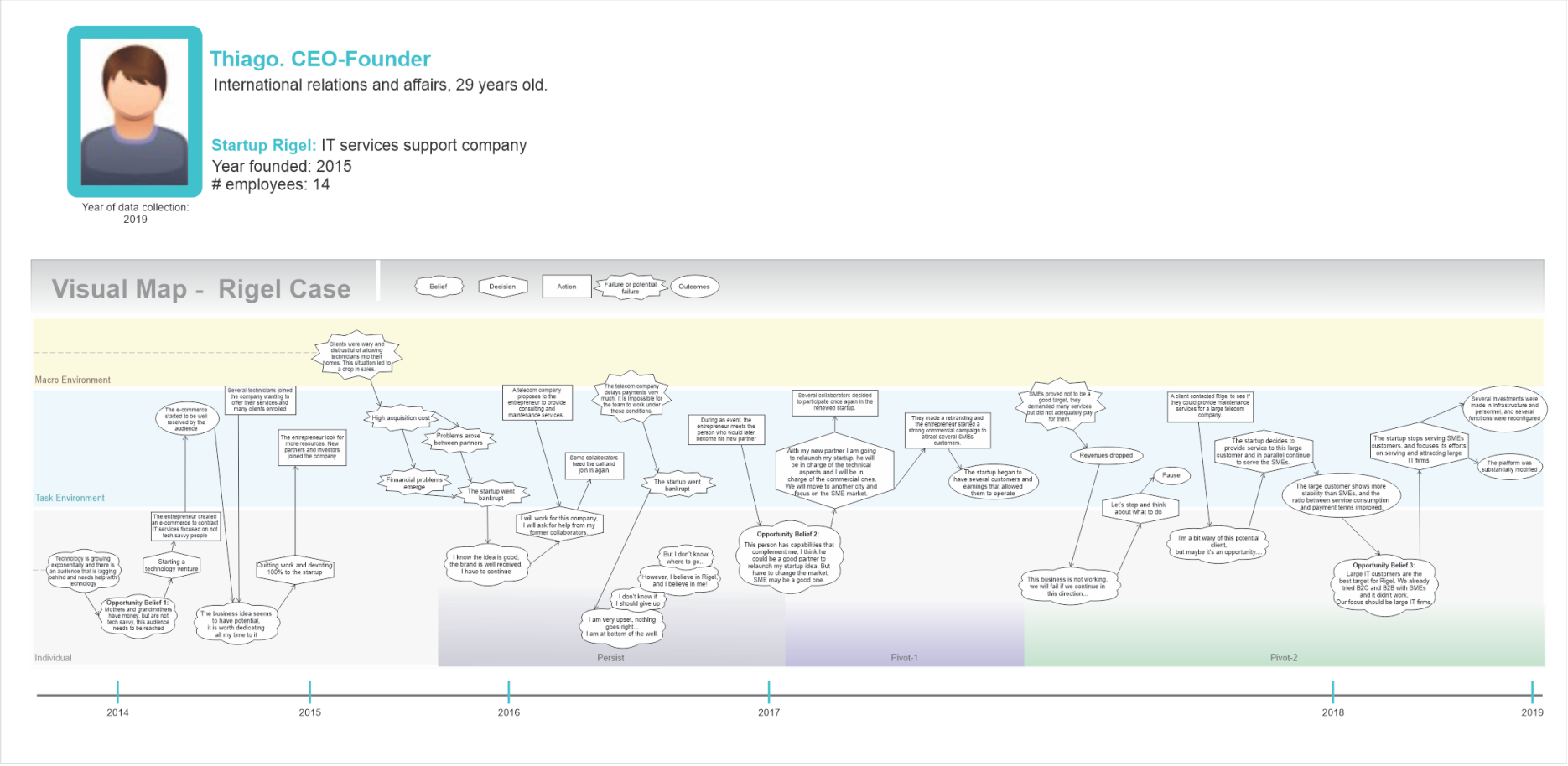
The new OB seemed to be quite promising; however, after a while, the entrepreneurs got swamped with orders and claims that considerably increased operational costs and expenditures, which could ultimately lead to the startup's bankruptcy. To counteract that

situation, the entrepreneurs decide to find different options to make the business more profitable. So, they decided to test four ideas in parallel (Opportunity Belief 2.1, 2.2, 2.3, and 2.4 in Figure 29) and identify the one with the best economic benefit. This strategy drained most of the resources, prompting the entrepreneurs to pause their operations to analyze Centauri's future thoroughly. Finally, the entrepreneurs decided to pivot the venture in 2018 to a multi-sided platform model that connects users, insurers, and auto-parts distributors.

Rigel (Figure 30): Like Centauri, this startup pivoted twice. Rigel began in 2014 and 2015 as a marketplace in IT services focused on not tech-savvy people. The belief (OB 1 in Figure 30) that motivated Thiago to start his company was that "*mothers and grandmothers*" were an audience that needed a lot of technical support and was willing to pay for it. At that time (2015), the marketplace gained regional recognition, which led Thiago to seek more resources and new investors. However, customer acquisition suddenly stopped, causing the cost of acquisition to skyrocket. Thiago describes that this failure was derived from a cultural distrust prevailing at that time of allowing entry to a person who had been contacted through a platform. Costs became unsustainable, and the startup went bankrupt. Thiago decided to continue the operations by investing personal (and family) resources and persisted in the initial OB. The situation did not improve; on the contrary, during 2016, the entrepreneur depleted his own resources and entered a spiral of not knowing what to do and despair, as attested in the following extract: "*This was a very sad time for me, I was very bad, even physically. I had a burst appendix, I had surgery, my wife left me, I was at rock bottom. I had no money; this was a very bad phase . . . in the end, I learned a lot of things, I matured as a human being"* (Thiago).

During that period (at the end of 2017), Thiago participated in a meeting for entrepreneurs and met another entrepreneur who had developed a DJ marketplace. Finally, they decided to join together and form a new partnership. Thiago proposed continuing with the technology marketplace idea but pivoting it to serve SMEs (Small and Medium Enterprises) instead of end-users. They also moved to a bigger city and witnessed the first fruits of the pivoted business. However, after some time, SMEs proved to be not an adequate type of customer: SMEs usually do not allocate resources to technology, so they are not prepared to pay reasonable rates, and they also tend to delay payment. Again, Rigel went through financial constraints that once more set alarm bells ringing in Thiago's head. At this moment (2018), the entrepreneur decided to take a step forward and, together with his partners, decided to pivot the venture to serve big corporations this time.

Figure 30 – Visual map case Rigel



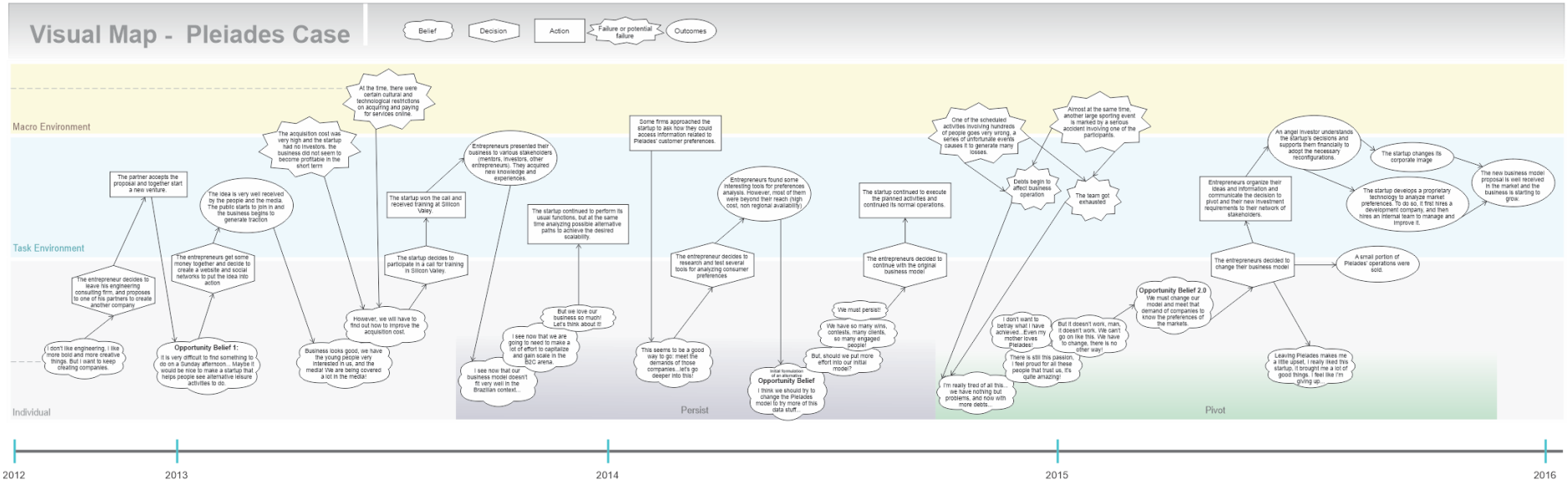
Source: created by the author.

Figure 31 – Visual map case Pleiades

José. Co-Founder
Unfinished mechanical engineering studies, 31 years old.

Startup Pleiades: Leisure activities planning firm
Year founded: 2013
employees: 5

Year of data collection: 2021



Source: created by the author.

Pleiades (Figure 31): Initially (in 2013), the OB of the startup was a marketplace of leisure activities such as shows, games, and excursions. To test this idea, the entrepreneurs created a website and social network profiles offering leisure activities. The idea was quickly accepted and gained widespread support from many users; however, the startup barely made a profit. The acquisition cost was very high, and the startup had no investors. Additionally—as signalized in the failure stemming from the macro environment in Figure 31—at that time (mid-2013), there were some cultural and technical barriers to acquiring and paying for services online. Nevertheless, the entrepreneurs prefer being persistent in the current course of action and committing more resources. Meanwhile, Pleaides received some proposals from other companies to provide market information and analyses, but the entrepreneurs' response was: "*although interesting, I didn't pay much attention to them at that moment, and we continued with Pleiades instead*" (José). Eventually, at the end of 2014, a series of failures jeopardized the continuation of the venture: accidents, reimbursement of users, logistical and financial problems, combined with the exhaustion of the team. At this point, the entrepreneurs realized that they needed an alternative direction; otherwise, they would exhaust all their resources and forces. Therefore, the team decided to pivot Pleiades in 2015 by attending to the proposals of the other companies to provide market analyses.

Ursa: Ursa followed a similar path to Pleiades. The firm was created in 2016, and its initial business model was to provide last-mile delivery services to end-users. Ben (former CTO) mentioned that their initial belief consisted of purchasing and delivering groceries to end-user that had made the order through the application. The startup grew rapidly and, between 2017 and 2018, raised financial resources from investors and gained a certain volume of customers. However, by the end of 2018, the startup began to face some failures and was not profiting sufficiently to ensure its sustainability. Despite the negative performance, the entrepreneurs persisted in their BM until the overwhelming takeover of a competitor that virtually put Ursa out of business. In 2019 the startup went bankrupt, and the entrepreneurial team decided to take a pause on the operations and assess some alternatives to enhance the situation. After several analyses, the entrepreneurs decided to *pivot* their product to the development of white-label digital solutions and sell them directly to stores and supermarkets, who would henceforth be in charge of the physical operation of purchasing, sorting, and delivery of orders. The startup thus pivoted its BM from a B2C to a B2B model.

Beta (Figure 32): Beta undertook three pivots in a six-year period. The initial belief (in 2011) consisted of a system of discount coupons for small and medium enterprises (SMEs). Due to the novelty, the idea was well-received among both establishments and potential

customers. Indeed, in 2013 the startup was invited to participate in an accelerator program, where an adviser suggested the entrepreneurs pivot their market because SMEs eventually will limit the firm's scalability. Encouraged by this warning of failure, the entrepreneurs decided to accept the suggestion and pivoted their model to serve large corporations. The startup continued to grow and entered into another acceleration program in the middle of 2015—this time an international program of renowned reputation. In that program, mentors pointed to two potential failures that could hinder the startup's expansion: outdated technology and a mismatched corporate image. Regarding the technology, the entrepreneurs agreed and made the pivot: they basically changed the whole technology and created a new platform. However, they disregarded changing the corporate image. Lina emphasized that the founders resisted pivoting their overall corporate image "*because we thought we were very well known. At that time, we had about 400,000 users. And we thought that at this level, we could no longer change our visual identity*." Only after conducting a series of experiments during 2016-2017 supported by the accelerator that the entrepreneurs finally pivot the corporate image of their business.

Fornax (Figure 33): In 2013, the startup created an ERP (Enterprise Resource Planning) for SMEs with an aggressive digital marketing strategy. However, during the same year, hundreds of startups offering similar products popped up. Thus, the price of AdWords services skyrocketed, defeating the company's marketing strategy. While looking for a new marketing strategy, the startup found a new potential vehicle for promotion: the accountants. The team encountered accountants as the entrance door for final clients (i.e., SMEs), so they changed part of their business strategy by incorporating accountants. Nevertheless, the accountants did not bring the expected results. Once again, the firm undertook a series of assessments and came to the conclusion that it had been a big mistake "*trying to turn the accountant into a software vendor*" (Marco). Therefore, in 2015, Fornax pivoted its strategy and integrated the option of franchising the model to accountants and non-accountants.

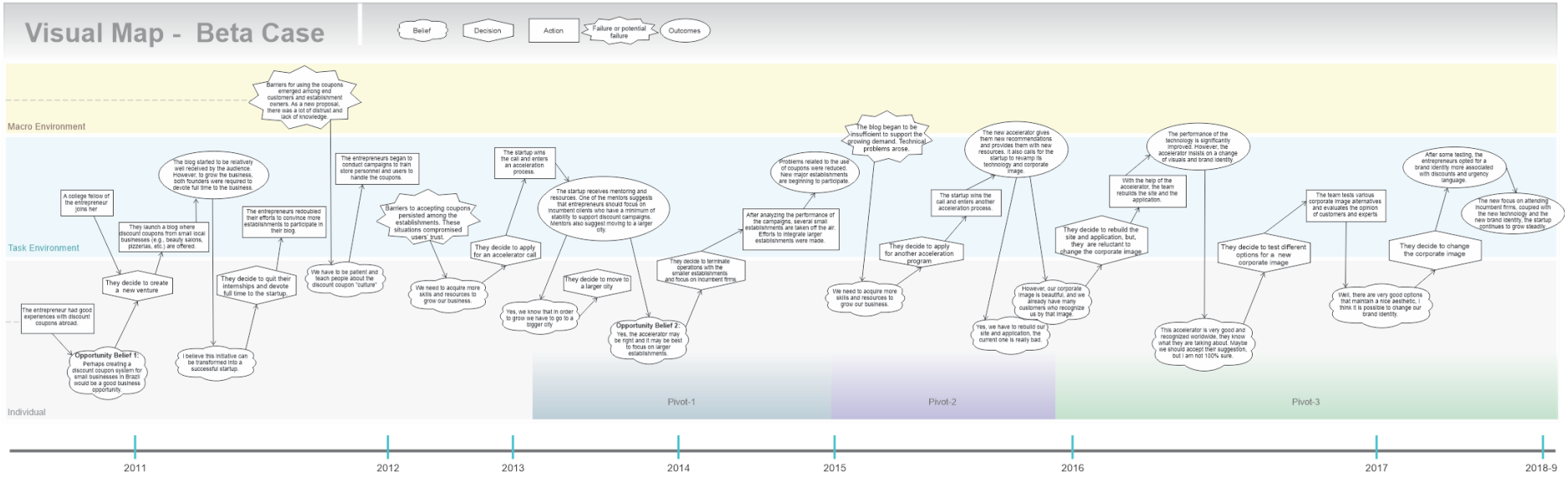
In 2020, the firm performed a second pivot due to the pandemic. Like several startups, during the first quarter of 2020, Fornax witnessed a drop in numbers. Many of their clients (SMEs) had to cut costs, including the services provided by Fornax. Therefore, after a brief period of analysis, the entrepreneurial team pivoted their startup to serve big corps (instead of SMEs), as they were by far the least affected by the pandemic.

Figure 32 – Visual map case Beta

Lina. Co-Founder - Growth director
Economist, 29 years old.

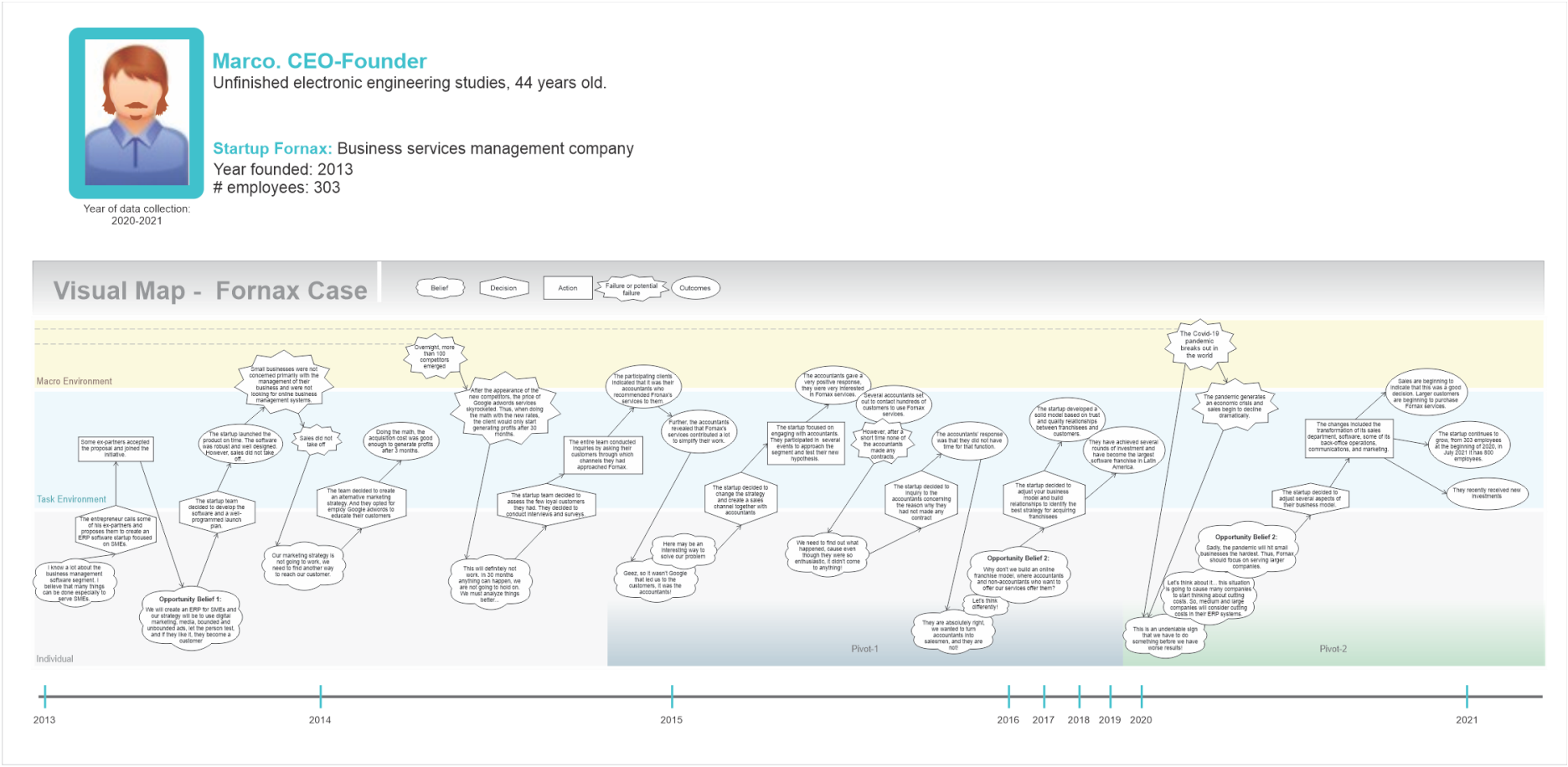
Startup Beta: Startup specialized in the management of discount coupons and promotions
Year founded: 2011
employees: 32

Year of data collection: 2019



Source: created by the author.

Figure 33 – Visual map case Fornax



Source: created by the author.

Vega (Figure 34): Vega had its origins as a plastic product design and development company. Although with a relatively promising start, in terms of customers and production, failures between the members ended with the termination of the partnership. Martin relates that during this period (2010), he experienced feelings of frustration and depression due to the failure and uncertainty about what to do. Then, a couple of friends proposed to him to resume the company, but with a different approach. Martin responded by proposing pivoting Vega into a PVC pipe supplier to a large market player. His friends support him and enter into a new partnership. In this way, the company grows and stabilizes; however, one of the partners revealed to be dissatisfied and eager to pivot the model toward something linked to sustainability.

By the middle of 2012, the founders analyzed their strengths and environmental opportunities and resolved to pivot Vega towards manufacturing architectural products from recycled plastics. However, substantial production and sales failures arise after a while, prompting the team to rethink the model once again. Thus, the team decided to pivot the BM, focus on social housing construction, and participate in a startup accelerator contest in 2016. They won the competition, improving their production processes, gaining visibility, and scaling the venture.

Pyxis: Pyxis was created in 2015 and initially offered market intelligence services using predictive analytics tools. During 2016 and 2017, in an attempt to satisfy its investors and clients more and better, the company developed a multifunctional product. Notwithstanding, that product became increasingly complex and expensive ("a Frankenstein," according to Paul), preventing the startup from scaling. The entrepreneurial team perceived several failures concerning this product: a tight profit margin, non-recurring sales and revenues, and difficulties regarding development and actualization. To counteract the situation, at the end of 2018, Paul decided to pivot their strategy and focus on a simplified predictive tool with a distinct engine of growth. The actions were successful, and the startup rapidly grew. However, the pandemic broke out in 2020, causing several problems for the startup. On this occasion, the pandemic led to stoppages in the supply of devices that Pyxis was importing from China and sharp increases in operating prices. At the beginning of March, when the pandemic hit most countries hard, the startup recorded the worst sales scenario. Then, the founders decided to pause and slim down operations while re-thinking another BM. As a result, Pyxis pivoted once again to focus on providing digital privacy services.

Pegasus: This startup went through three pivots until it discovered a sustainable growth formula. Pegasus started in 2001 as a provider of ERP synchronization systems; however,

several disputes between partners prevented the company from continuing as it was. At that time, a friend of Nando (founder) proposed he work on an insurance management system. Nando agreed and decided to pivot Pegasus to provide systems for insurance companies. The venture developed a robust management system and achieved positive results (i.e., client, sales, number of subscribers). Unexpectedly, a failure emerged: the major client was caught up in a national corruption scandal, which unfortunately brought negative commercial consequences for Pegasus; as Nando explains: *This was very sad because I did an exceptional job, the system was very good . . . . But it was impossible to continue . . . Think about this: How would I sell an insurance system again, given the situation at that company that was indicted?*

After analyzing the context and internal situation, in 2005, Nando pivoted the BM and reformulated its belief to offer a cross-devices digital content manager. The startup benefited from being a pioneer and achieved satisfactory results. However, the rapid emergence of the iPhone-type dominant design (that led to several devices' obsolesce) and new competitors' rise led to a dramatic decline in sales and revenue. Nando had to lay off most of the staff and stop almost all operations. Fortunately, a potential customer asked him to develop a new type of product (a kind of content manager system). Naldo and his partner delivered an extremely efficient product in record time, leaving this customer very satisfied. Therefore, Nando realized the potential of this product and finally (in 2007) pivoted Pegasus to focus on DOOH (Digital Out of Home) and digital signage systems.

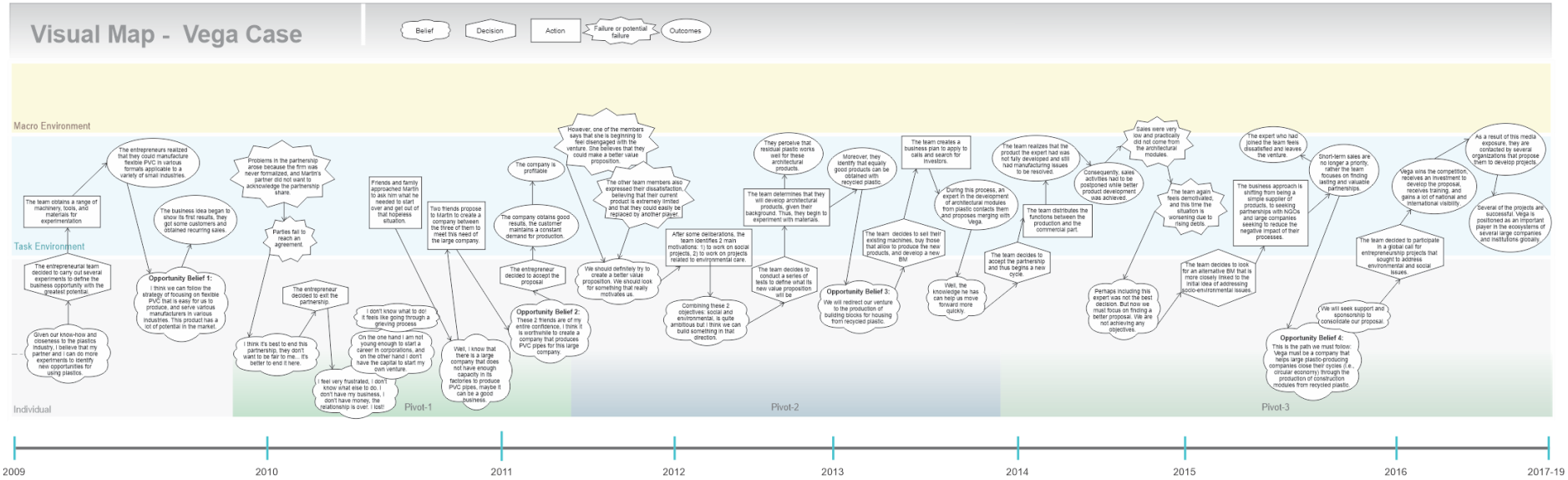
Carina: The startup began in 2008 by providing logistical support for an innovative initiative that connected customers with restaurants. Although the startup team had decided to assume these activities aiming to create a new digital platform, failures such as delays and constant setbacks in day-to-day operations meant that this objective was increasingly far from being achieved. On the one hand, this situation prevented the startup from growing, and on the other hand, it led to the team becoming exhausted and unsatisfied. Beto (co-founder) explained: *We had a meeting, and we said: look, we joined the company to make things happen [the platform]. That's why we left our jobs; we even cut our salaries in half, you know? And three years later, things were not happening*." At that point, in 2011, the team resolved to run both beliefs—logistics services and the food delivery platform—in parallel. However, the food delivery platform proved to be the most scalable and fastest-growing, so the team decided to pivot and focus its activities exclusively on this platform.

Figure 34 – Visual map case Vega

Martin. Key business manager/ Co-Founder
Architect, 38 years old.

Startup Vega: An enabling company aimed to help plastic industries to close their production cycle by transforming recycled plastic into products for construction.
Year founded: 2010
employees: 28

Year of data collection: 2019



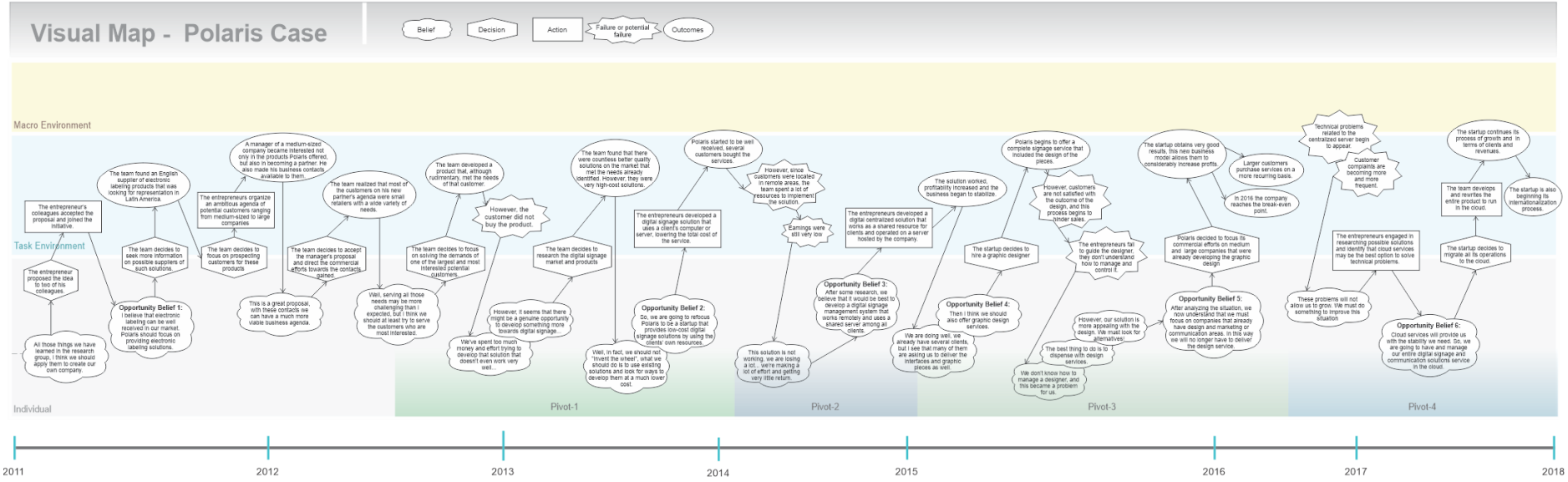
Source: created by the author.

Figure 35 – Visual map case Polaris

Roger. CTO/ Co-Founder
Electronic Engineering, 31 years old.

Startup Polaris: Firm specialized in automating digital communication processes
Year founded: 2013
employees: 25

Year of data collection: 2018



Source: created by the author.

Polaris (Figure 35): This firm suffered multiple pivots (a total of four) during its journey. Polaris was established in 2011 from an academic project, and the original belief consisted of offering electronic labeling products for retailers. Shortly thereafter, a potential client asked them to develop a digital label system for a retail store, and the team did so even though it demanded a lot of resources. The resulting system was robust and fulfilled the task; however, the potential client (a retailer) refused to acquire the product. This situation led the team to rethink their BM and create a simplified version of their product. Then, in 2013 they pivoted Polaris and focused their belief on providing low-cost digital signage solutions for diversified firms. However, the team still struggled with the high installation and maintenance costs, which were reflected in the low sales volume. Therefore, the entrepreneurs made a second pivot and reformulated the offering to make maintenance processes remotely and allow sharing of key resources among clients.

In early 2015, the entrepreneurs also decided to integrate a design function in an attempt to serve clients better. Notwithstanding, the startup had several failures (e.g., coordination, deadline achievement) with that function, which affected sales. Then, they pivoted by eliminating that function from the business offering and focusing on firms that already count on design or marketing functions. This new formula worked properly and rendered satisfactory performance. However, new technical failures arose with the increase in the number of clients. Clients were constantly complaining about technical instabilities, a situation that was jeopardizing the startup's growth. Therefore, in 2017, the entrepreneurs decided to pivot once again and reconfigured the platform (now based on cloud computing) to provide an efficient and reliable system.

Columba: The startup was established in 2014 from an academic project, and the original belief was to offer software and hardware solutions for waste management. After developing a series of sensors (accompanied by software programs) and conducting several pilots, the founders realized some potential failures regarding manufacturing and logistics costs that exceeded the estimated values, eventually making the offering unsustainable. The first reaction of the founders was to terminate the startup as it would require substantial additional investment to continue to operate. However, an angel investor raised a different point of view and suggested to them find a way to pivot Columba. Lucas commented that seeing the angel investor's confidence in him motivated him to look for ways to reformulate his business beliefs. Finally, in 2017, After some deliberation, Lucas decided to pivot the offering and narrow it down to software solutions. This move enabled the startup to enter new industries and emerge as a player in reverse logistics processes in the region.

Aquila (Figure 36): Aquila was established in 2013. The initial OB consisted of developing software and hardware solutions to monitor and manage the energy consumption of big corporations. The team created a simulated solution (Wizard of Oz testing method) to test this idea and started offering consultancy services. Aquila's proposal proved to fit well with the market, and the startup obtained its first customers. However, some failures in hardware production became significant and very frequent, leading to, on the one hand, the team's exhaustion and, on the other, resource depletion. In 2018, the team decided to formulate a new belief and set a new course of action to improve the current situation, so they pivoted Aquila. Significant changes were made: 1) all partners committed themselves full time to the startup, 2) the hardware was outsourced, so the business core was software solutions, and 3) the product design enabled to plug several functionalities; therefore, the offering could be staged to serve a wide range of firms (from SMEs to big corps).

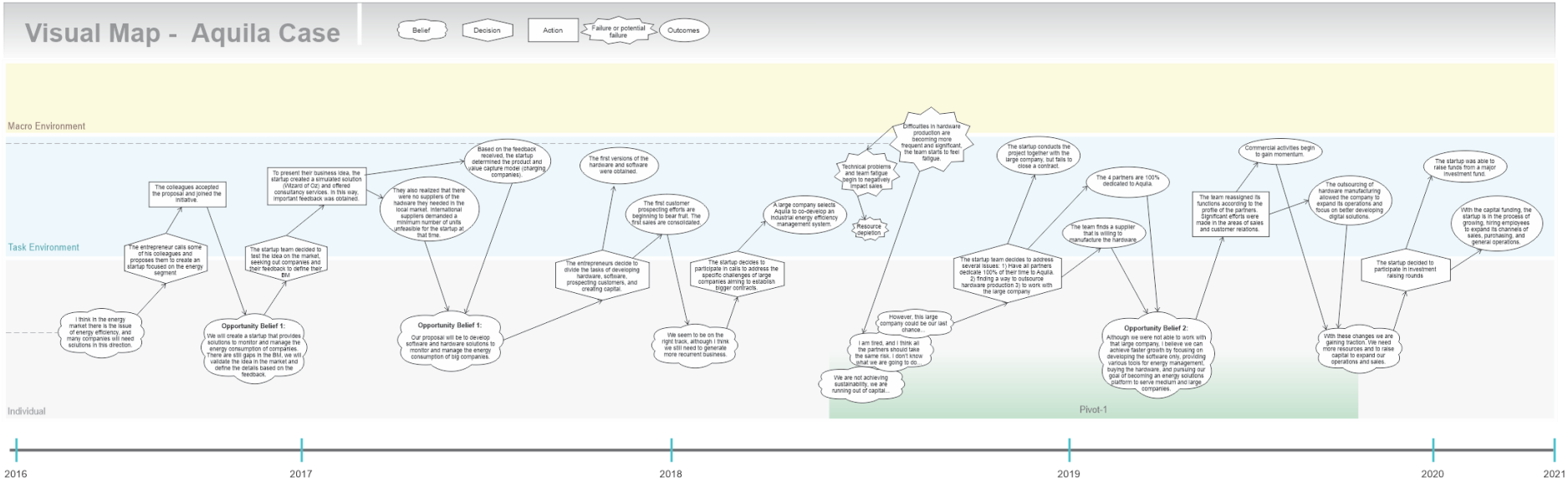
Alpha: Similar to Ursa, this startup pivoted the BM from B2C to B2B. Alpha was founded in 2014, and its initial OB consisted of a marketplace where travelers could find and mix various multimodal transportation alternatives. However, the results were not as expected. There were many constraints related to the low digitization of transportation and payment options. To the disappointment of the entrepreneurs, the marketplace became a bus ticket sales system. However, between 2015 and 2016, low-cost airlines started operating in the local market; therefore, the entrepreneurs saw the opportunity to add this modality to their platform. At a meeting to present the platform to one low-cost airline, the entrepreneurs perceived that the proposal did not attract much attention from the company. However, this airline commented that it had other more urgent and important issues to address, such as enabling payments abroad and improving its visibility in networks and digital sales channels. Finally, the airline asked Alpha to manage their online sales system, as the company did not have sufficient resources to do so. The entrepreneurs, unsatisfied with Alpha's results, opted to attend this proposal and pivoted the platform. The OB was refocused on operating under the B2B model, serving airlines and travel agencies. Thus, the startup grew rapidly, capturing the interest of investors and reaching international markets.

Figure 36 – Visual map case Aquila

Sixto. Co-Founder
Environmental engineer, 31 years old.

Startup Aquila: Startup specialized in intelligent energy monitoring (IoT) services and energy management based on Big Data.
Year founded: 2016
employees: 10

Year of data collection: 2021



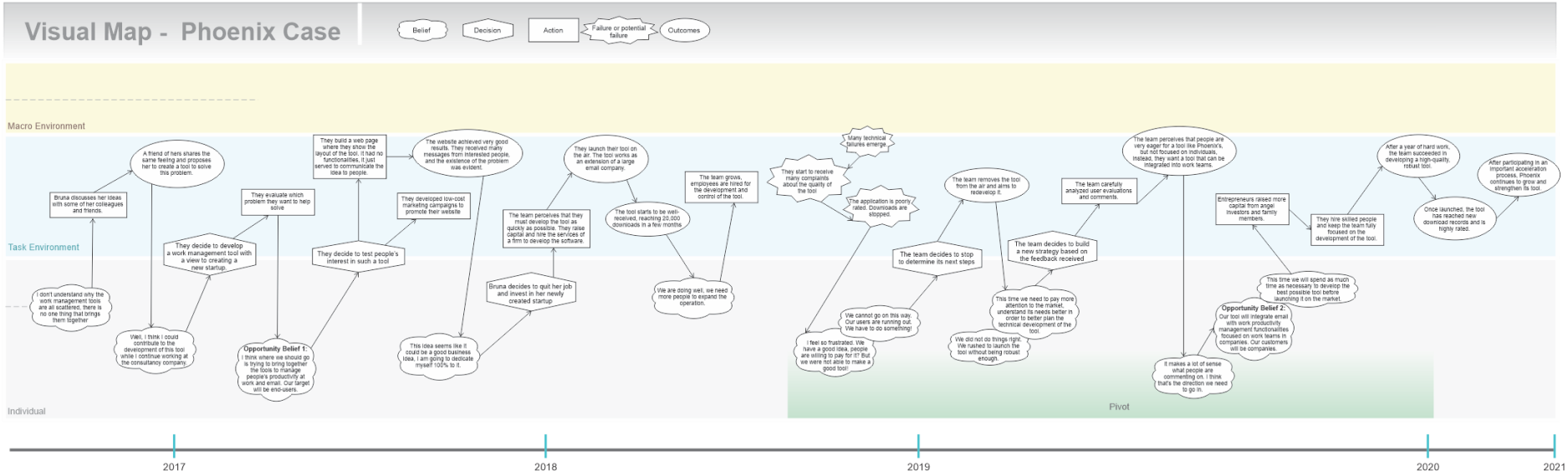
Source: created by the author.

Figure 37 – Visual map case Phoenix

Bruna. Co-Founder - Growth director
Mechanical Engineering, 30 years old.

Startup Phoenix: Productivity email tool that applies the concept of Kanban
Year founded: 2017
employees: 12

Year of data collection: 2021



Source: created by the author.

Phoenix (Figure 37)*:* Phoenix was established in 2017 based on an initial belief of offering a productivity-manager tool for private individual users (B2C). The entrepreneurs clearly identified the opportunity and quickly tested it through a website. Once they reached a certain threshold of potential users, they invested resources to develop the tool and bring it to the market in the shortest possible time. However, developing the tool in such a rush entailed considerable failures regarding technical drawbacks. A vast number of users claimed that the Phoenix had hit the nail on the head when it proposed to address a real need yet had fallen short in executing it; consequently, the number of downloads dropped. At the same time, users suggested that the tool should not just address individual users but rather a group of people (like co-workers). Therefore, the entrepreneurs immediately decided to pivot and redevelop the tool, but this time focused on serving companies' workgroups in a B2B model.

Andromeda: The startup was conceived in 2015 to provide logistics services for legal firms. It basically operated through a two-sided platform that connected customers (legal firms) and couriers. The startup performed well, albeit with modest growth. During a co-founders meeting, Jim raised a potential failure: several legal procedures would be digitized in the short term, dismissing the need to receive and deliver physical documents. As Jim explained: "*it would mean that at some point, the company would naturally cease to exist.*" In viewing this potential failure, the team decided to pivot the business in 2016 to counteract this possibility, although it did not know exactly how. Therefore, they list alternative value propositions that could use the developed platform. The team selected the most favorable and ran in parallel with the logistics services. The performance results led the startup to conclude that it should pivot and focus on the new proposition of connecting repair shop networks with auto parts distributors.

Betelgeuse: The startup emerged in 2015 as part of a customer loyalty program of a group of industrial companies. Since its launch, Betelgeuse reported good results; the number of customers, partner stores, and sales have increased steadily. However, when a new industrial company was going to be integrated, the platform started to have many failures due to breaches and delays caused by the software supplier. These issues alerted Adal (founder) because he understood that Betelgeuse would be unable to scale up under these conditions. Therefore, Adal pivoted the company and decided to incorporate the development and maintenance functions of the platform into the startup. The pivot also involved the development of a new version of the platform, which in turn allowed the integration of new functionalities and thus the expansion of the BM.

Helio: The startup, created in 2014, was a pioneer in developing a platform to connect logistics firms, industries, and truck drivers. Due to Caio's deep knowledge of the market, the venture started to be well received; users from all sides were growing in number and investors. During 2015-2016, Helio was invited to participate in an international acceleration program of a renowned technology company; there, the entrepreneurial team received training and a wake-up call about the necessity for revamping their technology. The accelerator mentors basically predicted that the startup would not be able to scale because its technology had severe bottlenecks and processing times were not competitive. By perceiving this potential failure, Caio and his team pivoted Helio and rebuilt their platform from scratch, supported by a team of expert developers and partners of the accelerator.

Antares: Antares was created as a producer and seller of palm heart. The company, however, encountered several setbacks related to production costs, a high number of competitors, and a concentration of bargaining power with distributors. Meanwhile, Danilo (founder) perceived that too many vegetable fibers were wasted for palm hearts to be produced. Thus, he decided to pivot his company and become a developer and licenser of technologies for the utilization of these vegetable fibers. Danilo asked two researchers to join the startup, invested in equipment, and developed a modest portfolio of technologies. Notwithstanding, during the interactions with potential clients, Danilo perceived that clients did not value the technologies properly; in other words, they were willing to pay very little for the offering. Therefore, once again, the entrepreneur pivoted Antares, but this time, the model would be to provide solutions from biopolymers (e.g., oil containment booms, oil absorbers).

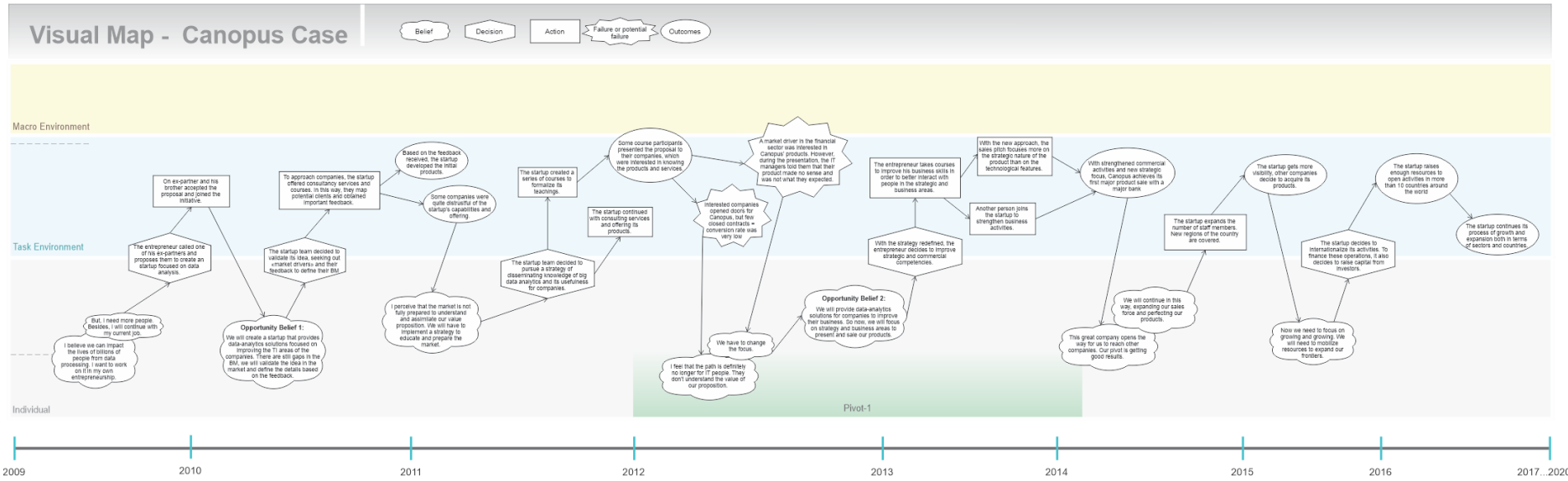
Canopus (Figure 38): The startup was created in 2010 with an initial belief of providing data-analytics solutions for companies. Simon established a strategy to approach companies through the areas of information and technology (IT). However, shortly after initiating the interactions with companies, the entrepreneurs realized that IT specialists were not taking seriously the strategic advantages that Canopus could provide. Simon explains that they "*were called lunatics*" and emphasizes that on one occasion, during a meeting with a major bank, "*someone from the bank called us crazy, it was a meeting that would last an hour, not even after half an hour, and he asked us to leave, because it wouldn't suit the bank*." After that meeting, Simon proposed his partner pivot Canopus, changing the strategy for approaching companies and targeting the new business and strategy areas, as they would be able to perceive better and understand the value that Canopus could provide to the company.

Figure 38 – Visual map case Canopus

Simon. CEO-Founder
Foreign trade professional, 41 years old.

Startup Canopus: Data-driven solutions company
Year founded: 2009
employees: 400

Year of data collection:
2020



Source: created by the author.

North Star: Similar to Columba and Pleiades, the startup was established in 2017 from an academic project and offered photomedicine solutions in a B2C model. After concluding the prototypes in the middle of 2018, the entrepreneurs started to interact with several potential users. At that point, the team realized two important aspects: 1) users required some level of customized products, and 2) the value for which users would be willing to pay for the solution was far below production costs. These two findings warned of potential failures that could put the company at risk because the production costs would simply be too high. Bearing this in mind, Tim (co-founder) pivoted North Star and created a multi-sided platform that connected, on the one hand, "*scientists and investors that together with North Star, create new digital medicines*," and on the other hand, "*the applicators, or prescribers, who are the doctors, who apply the treatment to the patients*" (Tim).

The new model attracted a considerable number of scientists and doctors; in fact, several digital medicines were proposed. However, Tim and his team rapidly noted that it would be unfeasible to develop all digital medicines by themselves. Additionally, the costs for producing a wide variety of medicines were still very high, limiting the number of users. Having these two new potential failures in mind led the entrepreneurs to pivot North Star, this time focusing on offering a few standardized solutions (digital medicines) to be applied under medical guidance.

Draco: The company was created in 2015 with an initial belief of serving SMEs in management and financial control processes. Alan (co-founder) and his team developed a robust digital tool that integrated several functions which enabled SMEs to record financial information, connect it to official databases, and make intelligence from that data. In this way, Draco obtained good results; customers were quite satisfied with the performance of the tool, which resulted in the growth of the startup. However, the economic and political crisis during 2016 caused some clients to cancel Draco's services. Additionally, some technical failures regarding automatization and some functionalities increased developers' time and costs, ultimately limiting escalation. Yet, Draco continued to struggle and entered several accelerator programs that opened the doors for the startup to approach large corporations. In 2019, a major sporting goods network became interested in Draco's tool and proposed to do business with the company. Alan accepted the proposal and decided to reconfigure some aspects of the BM and the offering to attend now big and small corps in parallel. Over time, the startup realized that big corps proved to be more stable customers, which allowed the team to refine the tool more steadily. Therefore, the startup pivoted and centered only on serving big corporations.

Visual maps and descriptions allowed us to organize and synthesize the cases studied comprehensively. From these maps, we started to identify some of the critical events in pivoting decisions and how they relate to each other. For instance, we pointed out how the beliefs guided the decisions and subsequent actions of the entrepreneurs and how, in turn, the outcomes of those actions influenced the beliefs. However, given the relatively large number of pivots analyzed (39), cross-case comparisons are difficult from these descriptions and complex visual maps since they comprise abundant elements. Therefore, we decided to employ multiplicity maps as these visual tools facilitate the representation of the sequence of events in a more simplified way. We present these maps below.

5.2 MULTIPLICITY MAPS

In order to establish a visual mechanism to make cross-case comparisons between all pivots, we elaborated 39 multiplicity maps (corresponding to each pivot of our cases) that show the sequence of events performed by the startups. Based on the visual maps and coding analyses described in section 4.5, we identify the critical events in pivoting decisions. Following Pentland et al. (2020, p. 18), we plotted these events in a network "to get a more complete view of the space of possible paths" followed by the entrepreneurs during pivots. In the multiplicity maps, the ovals indicate the events that occurred (each color corresponds to the second-order theme in which the first-order codes are aggregated, see Figure 24), and the lines show the pathways of these events. Green lines represent the pathways that lead to pivots, while the red ones the pathways that lead to persisting. Further, to represent the sequential relation of events, we drew a line that starts with a dot and ends with the arrowhead. The 39 multiplicity maps are presented in Figure 39.

Figure 39 – Multiplicity maps

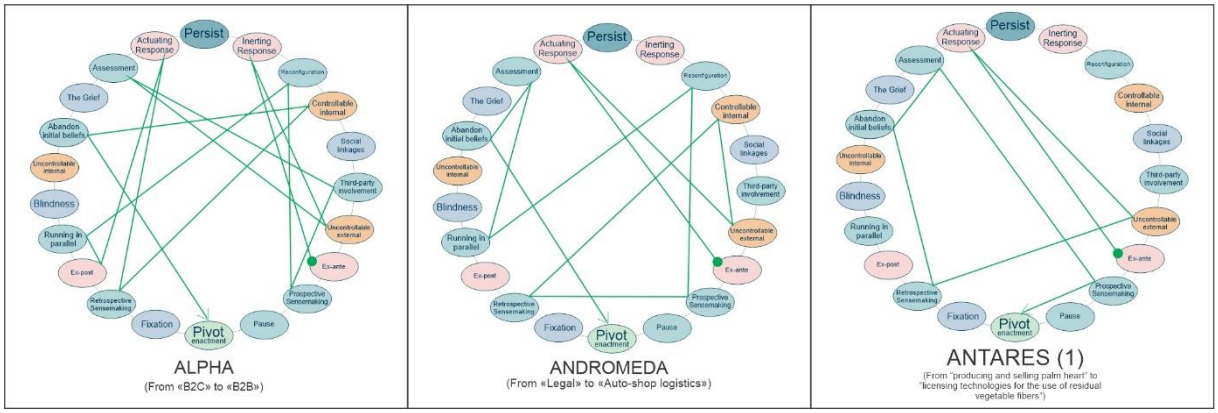


Figure 39 – Multiplicity maps (continued)

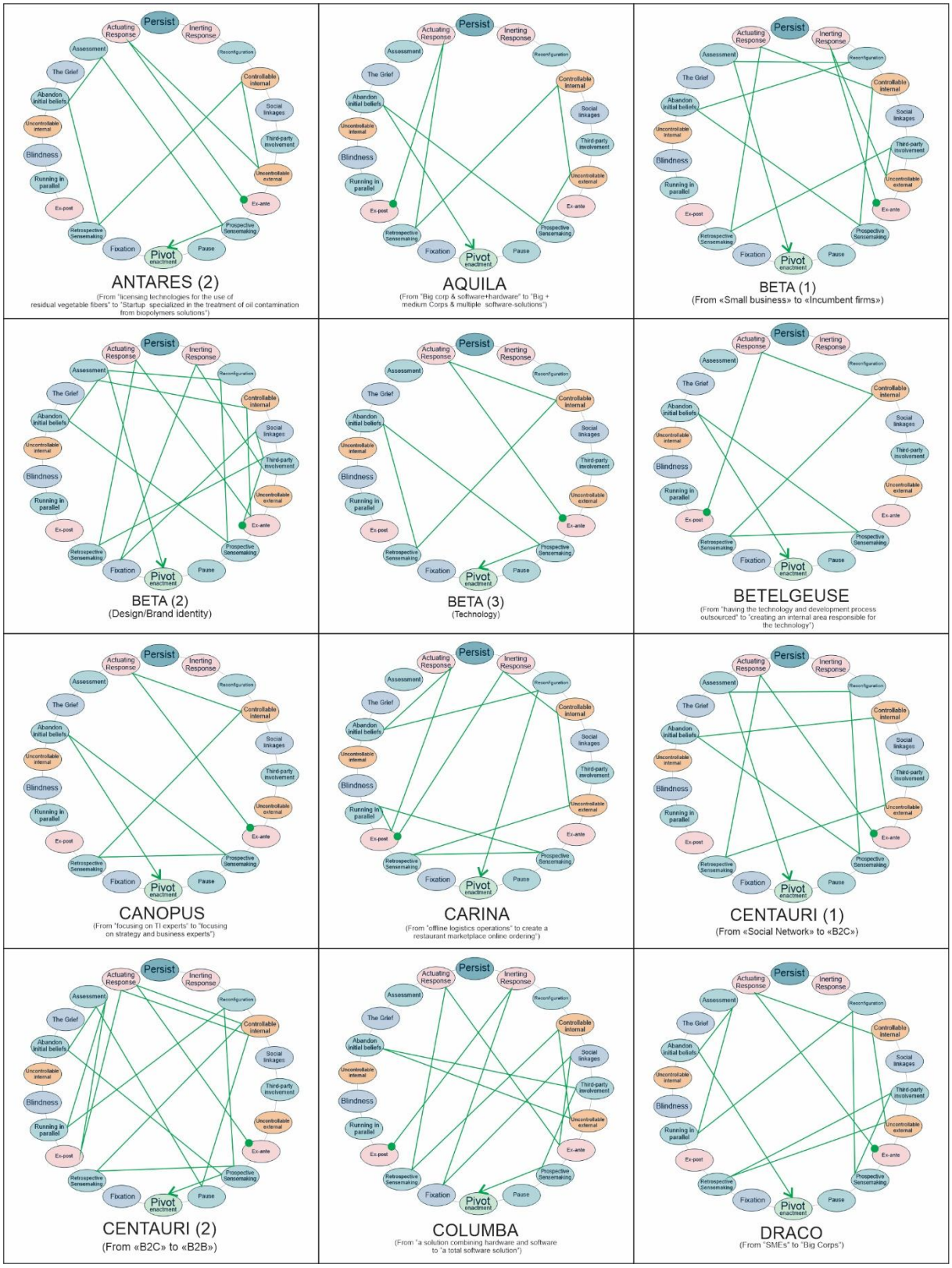


Figure 39 – Multiplicity maps (continued)

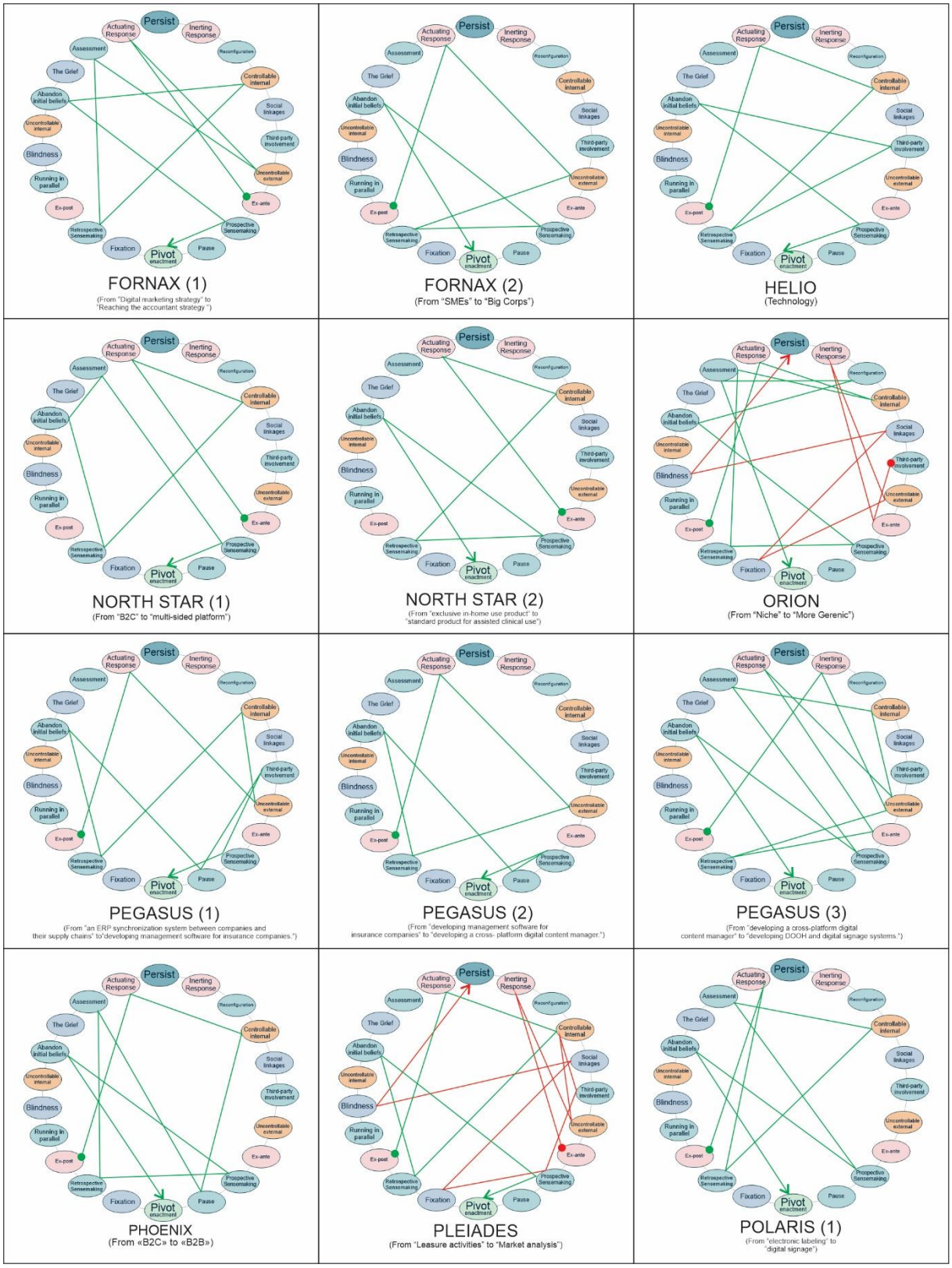
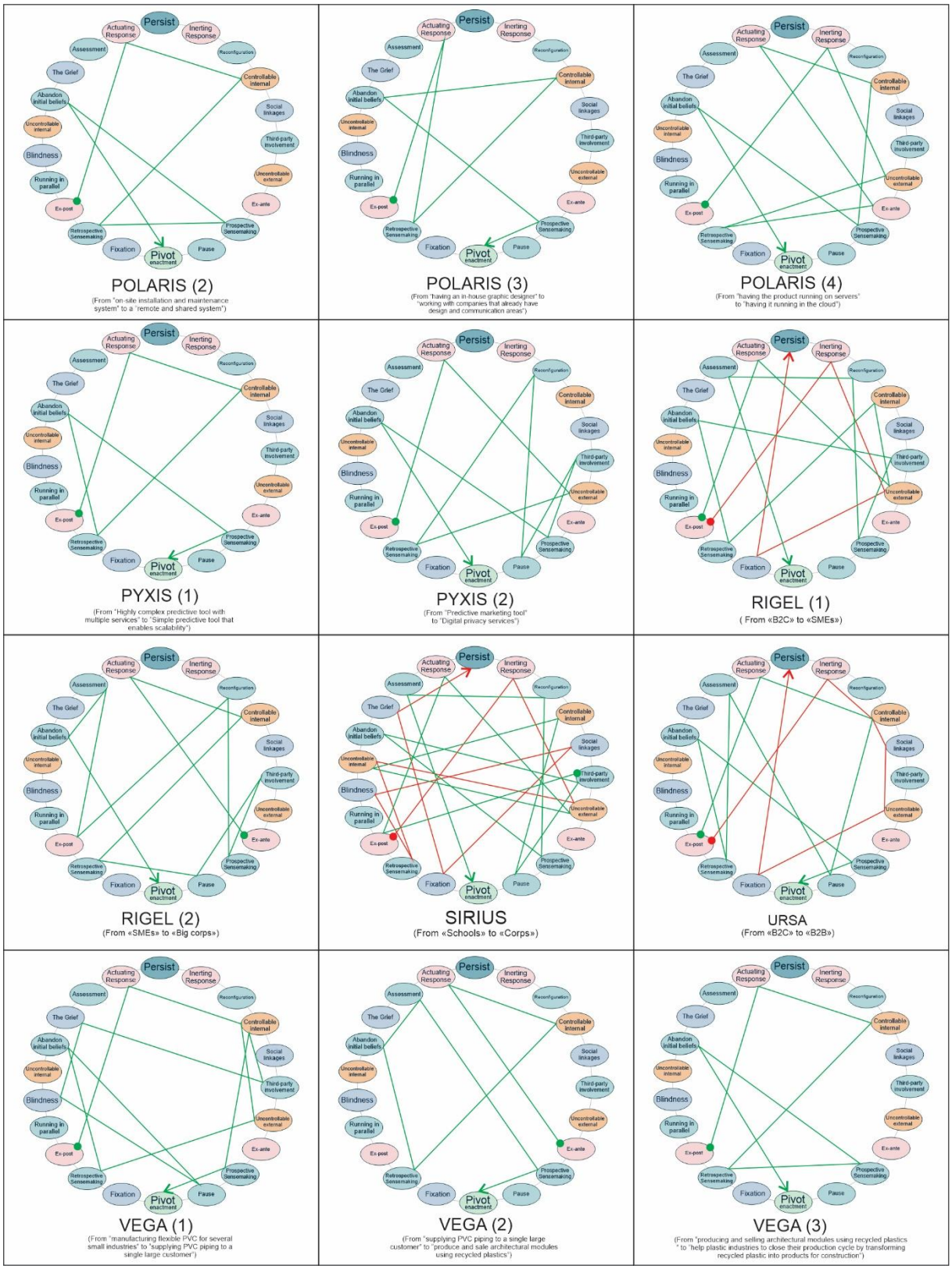


Figure 39 – Multiplicity maps (continued)

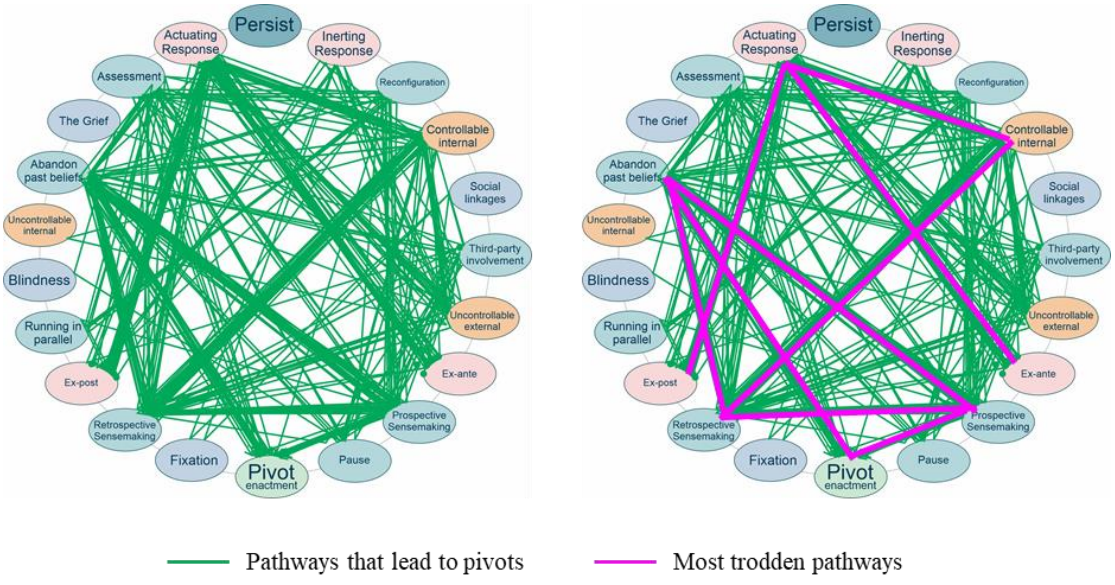


Source: created by the author.

Multiplicity maps allowed us to identify the "flow of possibilities" (Pentland et al., 2020, p. 8) followed by entrepreneurs during pivoting. By observing these maps, it is noticeable that pivoting does not occur in the same way and even varies within the same startup—e.g., Rigel (1) and (2), or Pyxis (1) and (2). In other words, this demonstrates the *multiplicity* (Pentland et al., 2020) character of pivoting processes, in which one process (pivoting) has many possible paths (as shown in Figure 40). However, multiplicity maps also revealed some patterns in pivoting decisions. For instance, we identified five cases in which the entrepreneurs decided to persist before pivoting (Orion, Rigel (1), Sirius, Ursa, and Pleiades, as shown in Figure 39). We also identified that the minimum number of events involved in pivoting decisions is seven—as happened in the cases of Beta (3), Betelgeuse, Canopus, Fornax (2), North Star (2), Polaris (2) and (3), Pyxis (1), and Vega (3) (see Figure 39). More interestingly, this minimum number sheds light on which events actually underlie pivoting.

The multiplicity maps also informed the most common pathways and indicated the most recurrent events performed by entrepreneurs. Figure 40 shows the overlapping of each pathway that the entrepreneurs followed to pivot. The most "trodden" paths (highlighted by a pink line on the map on the right in Figure 40) also provide a hint about the more fundamental events of pivoting decisions.

Figure 40 – Overlapping multiplicity maps



Source: created by the author.

Table 8 – Cross-case comparison of the pivots

Pivot cases	Multiplicity maps events																		
	Inerting Response	Reconfiguration	Controllable internal	Social linkages	Actuating Response	Third-party involvement	Retrospective Sensemaking	Uncontrollable external	Ex-ante	Prospective Sensemaking	Pause	Fixation	Ex-post	Running parallel	Blindness	Uncontrollable internal	Abandon initial beliefs	The Grief	Assessment
Alpha	X	X	X		X	X	X	X	X	X			X	X			X		X
Andromeda		X	X		X		X	X	X	X				X			X		X
Antares (1)					X		X	X	X	X							X		X
Antares (2)			X		X		X	X	X	X							X		X
Aquila			X		X		X	X		X			X				X		
Beta (1)	X	X	X		X	X	X	X	X	X							X		X
Beta (2)	X	X	X	X	X	X	X		X	X		X					X		X
Beta (3)			X		X		X		X	X							X		
Betelgeuse			X		X		X			X			X				X		
Canopus			X		X		X		X	X							X		
Carina	X	X	X		X		X	X		X			X	X			X		
Centauri (1)		X	X		X		X	X	X	X						X	X		X
Centauri (2)		X	X		X		X		X	X	X		X	X			X		X
Columba	X		X	X	X	X	X	X	X	X		X	X				X		
Draco		X	X		X	X	X	X	X	X				X			X		X
Fornax (1)			X		X		X	X	X	X							X		X
Fornax (2)					X		X	X		X			X				X		
Helio			X		X	X	X		X	X							X		
North Star (1)			X		X		X		X	X							X		X
North Star (2)			X		X		X		X	X							X		
Orion	X	X	X	X	X	X	X	X	X	X		X	X		X		X		X
Pegasus (1)			X		X	X	X	X		X	X		X				X		
Pegasus (2)					X		X	X		X	X		X				X		
Pegasus (3)	X		X		X		X	X	X	X			X				X		X
Phoenix			X		X		X			X	X		X				X		X
Pleiades	X		X	X	X	X	X	X	X	X		X	X		X	X	X		
Polaris (1)			X		X		X			X			X				X		X
Polaris (2)			X		X		X			X			X				X		
Polaris (3)			X		X		X			X			X				X		
Polaris (4)	X		X		X		X	X	X	X			X				X		
Pyxis (1)			X		X		X			X			X				X		
Pyxis (2)		X			X	X	X	X		X	X		X				X		
Rigel (1)	X	X	X		X	X	X	X		X		X	X				X		X
Rigel (2)		X	X		X	X	X		X	X	X			X			X		X
Sirius	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X
Ursa	X		X	X	X		X	X		X	X	X	X				X		X
Vega (1)			X		X	X	X	X		X	X		X		X		X	X	
Vega (2)			X		X		X		X	X							X		X
Vega (3)			X		X		X			X			X				X		
Total: 39 cases	12	13	**35**	6	**39**	14	**39**	23	22	**39**	9	7	24	6	4	3	**39**	2	20

Source: created by the author.

In order to better compare how pivot decisions vary across cases and to identify the commonalities, we created a vignette table (Table 8). From this table, it is possible to observe which events occurred in all (or the great majority of) the cases. Such is the case of "controllable internal attribution" that occurred in 35 cases; and "actuating response," "retrospective sensemaking," "prospective sensemaking," and "abandon initial beliefs" that all occurred in the 39 cases. This table complements the multiplicity maps. On the one hand, the table enables us to rapidly identify the differences and commonalities of the cases. On the other hand, the multiplicity maps enable us to better observe the sequence of events.

We retrieved several important aspects from the visual maps, case descriptions, coding analyses, multiplicity maps, and the cross-case comparison table. First, based on the visual maps and case descriptions, we identified the fundamental elements of pivoting (i.e., beliefs, decisions, failures, actions, and outcomes) and how they interrelate. For example, we pinpointed the influence of beliefs on decisions and actions and the influence of failures and outcomes on beliefs. Likewise, we encountered that these fundamental elements occur at different levels (as shown in Figures 27 to 38): Some failures stemmed from the macro-environment level—e.g., Rigel (1), Fornax (1)—and others from the task-environment level—e.g., Pleiades, Phoenix. Some decisions were taken at the task-environment level—e.g., Centauri—while others at the individual level—e.g., Orion, Sirius. Certainly, beliefs occur at the individual level.

Second, coding analyses (described in section 4.5), multiplicity maps, and the cross-case comparison table enabled the refinement of the fundamental elements of pivoting and the systematic identification of events, characteristics, and core categories. Finally, we identified some critical patterns (e.g., the most trodden pathways in Figure 40) and differences (e.g., the cases of persistence before pivoting, as shown in Figure 39) that allowed us to pinpoint the underlying events of pivoting in startups. However, the identification of these events alone does not provide an adequate explanation of the pivot phenomenon. For this purpose, it is also important to determine how these events relate to each other. Therefore, we generated a data-grounded model that forms our alternative for understanding *how do entrepreneurs pivot their startups*. The process model of pivoting in startups is presented in the following chapter.

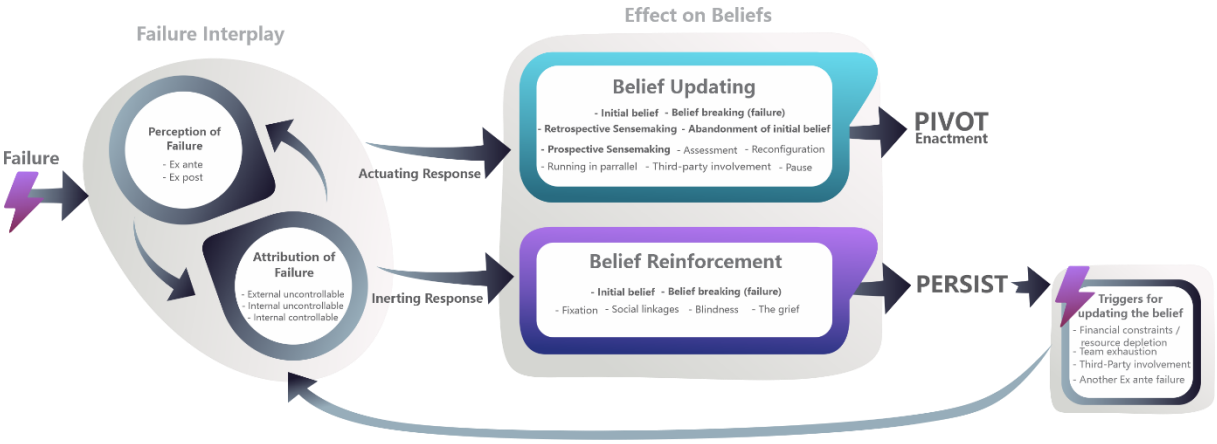
6 RESEARCH RESULTS: A PROCESS MODEL OF PIVOTING IN STARTUPS

This chapter presents our process model for pivoting in startups. In section 6.1, we introduce and exhibit the figure of our process model. In section 6.2, we explain the first building block: the failure interplay between the perception and the attribution of failure that results in two failure responses: actuating and inerting. In section 6.3, we describe the second building block that entails the effects of these responses on the beliefs regarding the failed aspect of the BM: belief updating and belief reinforcement. In section 6.4, we present the third block explaining how entrepreneurs move from a belief reinforcement situation to belief updating to pivot. Finally, section 6.5 presents the *approaches for pivoting* that emerged when examining the patterns of similarities and differences among the cases studied.

6.1 PROPOSING A PROCESS MODEL OF PIVOTING IN STARTUPS

Our process model for pivoting in startups emerged inductively based on the analyses of 39 pivoting cases in startups. To explore how the events identified in the visual and multiplicity maps and coding analyses chain together and form the different pathways to pivot, we identified the common building blocks that emerged during analyses: failure interplay, effect on beliefs, and triggers for updating the belief in case of persistence. In Figure 41, we plot these building blocks to generate our process model and pinpoint how they interact with each other.

Figure 41 – Process model for pivoting in startups



Source: created by the author.

The following sections detail each of the building blocks of our process model.

6.2 FAILURE INTERPLAY

The first building block of the model corresponds to *Failure Interplay*, the process in which the entrepreneurs perceive and attribute failures and culminates in two types of response: actuating or inerting. Considering that failures may vary in nature and can be perceived and understood differently by the entrepreneurs, our findings revealed that the way how failures are perceived and attributed plays a major role in determining whether the entrepreneurs will update their beliefs and pivot or rather, will reinforce their beliefs and persist. To illustrate the failure interplay, we can consider the case of Columba; a startup specialized in providing solutions for waste management. After a year and a half of operation, the entrepreneur (Lucas) perceived a series of failures ranging from technical difficulties to the inability to scale. Lucas attributed these failures to both controllable internal (e.g., poor execution of strategies) and uncontrollable external causes (e.g., increased costs of importing components), and his response was to continue on the same course of action expecting the situation to improve (i.e., an *inerting* response). However, after conducting a thorough financial analysis, including regulations and cost projections, Lucas realized that "*in the end, the bill didn't add up. In five years, we would get millions in the red*." The entrepreneur discussed his findings with his investor, who encouraged him to look for an alternative solution. At this point, Lucas decided to take some action (i.e., an *actuating* response) and reorientated his BM by focusing on the software and eliminating the hardware component of Columba's solution. Table 9 provides further evidence of the failure interplay and offers details related to the beliefs and failures involved in the pivoting cases.

Table 9 – Pivots details and failure interplay

Startup	**# of Pivots**	**Pivot(s) description**		**Failure(s)**	**Failure interplay**
		Belief before pivot	**Belief after pivot**		
Alpha	1	Online travel agency B2C	Online travel agency B2B	Financial constraints, inability to scale	Initially: inerting response, ex-ante, locus of uncontrollable external. Finally (after the intervention of a potential customer and assessing both models): actuating response, ex-post, locus of controllable internal, then pivoted.

Andromeda	1	A platform offering logistics services to legal firm	A platform offering logistics services to serving auto repair shops	The legal services will be digitalized, so offering logistics services for this sector will no longer be a viable business.	Actuating response, ex-ante, locus of controllable internal and uncontrollable external, then pivoted.
Antares	2	1) Palm heart productor and seller 2) Licensor of technologies	1) Licensor of technologies for using residual vegetable fibers 2) Biopolymers solutions producer	1) Highly price-competitive market 2) The offering was not well-valued by potential customers	1) Actuating response, ex-ante, locus of uncontrollable external, then pivoted 2) Actuating response, ex-ante, locus of uncontrollable external and controllable internal, then pivoted
Aquila	1	Provider of software + hardware solutions for energy management in large companies	Provider of software solutions for energy management in large and medium-sized companies	Resource depletion, team exhaustion	Actuating response, ex-post, locus of uncontrollable external and controllable internal, then pivoted.
Beta	3	1) Manager software of discount coupons and promotions for small businesses 2) Not specialized image product and brand design 3) Platform V.2.0	1) Manager software of discount coupons and promotions for large firms 2) Specialized image product and brand design 3) Platform V.3.0 with multifunctionalities	1) Inability to gain scale because small businesses were very unstable and demanded too many resources to solve problems 2) Potential loss of clients to competitors because of inconsistencies regarding how Beta communicated its value proposition 3) Existing technology was not able to support larger-scale operations.	1) Initially: inerting response, ex-ante, locus of uncontrollable external. Finally (after the intervention of a third party, an accelerator): actuating response, ex-ante, locus of controllable internal, then pivoted. 2) Initially: inerting response, ex-ante, then fixation. Finally (after the intervention of another accelerator and retrospective sensemaking): actuating response, ex-ante, locus of controllable internal, then pivoted. 3) Actuating response, ex-ante, locus of controllable internal, then pivoted.
Betelgeuse	1	Outsourced software management and development	In-house software management and development	Multiple technical issues, inability to scale	Actuating response, ex-post, locus of controllable internal, then pivoted.
Canopus	1	Sales strategy focused on IT area	Sales strategy focused on Business and strategy areas	Poor sales, low conversion rate	Actuating response, ex-ante, locus of controllable internal, then pivoted.
Carina	1	Offline logistics operations services	A food delivery platform	Inability to scale, unmotivated team, team exhaustion	Initially: inerting response, ex-post, locus of uncontrollable external and controllable internal. Finally (after financial constraints and team exhaustion): actuating response, ex-post, locus of uncontrollable external and controllable internal, then pivoted.
Centauri	2	1) Social network for car owners 2) B2C platform for vehicle repair	1) B2C platform for vehicle repair 2) B2B platform for vehicle repair and spare parts services	1) High transactional costs 2) Financial constraints, inability to scale, team exhaustion	1) Actuating response, ex-ante, locus of controllable internal and uncontrollable external, then pivoted. 2) Actuating response, ex-ante, locus of controllable internal, ex-post, then pivoted.
Columba	1	Provider of software + hardware solutions for waste management	Provider of software solutions for reverse logistics management	Multiple technical issues, potential financial losses, inability to scale	Initially: inerting response, ex-post, locus of uncontrollable external and controllable internal. Finally (after the identification of another potential failure and the intervention of an investor): actuating response, ex-ante, locus of uncontrollable external and controllable internal, then pivoted.
Draco	1	Digital financial services for SMEs	Digital financial services for large corporations	Inability to scale	Actuating response, ex-ante, locus of controllable internal and uncontrollable external, then pivoted
Fornax	2	1) A digital-general marketing strategy 2) Digital management services for SMEs	1) A marketing strategy based on accountants 2) Digital management services for large corporations	1) Competitors entry, difficulties in reaching users 2) Abrupt loss of clients and revenue (pandemic-related)	1) Actuating response, ex-ante, locus of controllable internal and uncontrollable external, then pivoted. 2) Actuating response, ex-post, locus of uncontrollable external, then pivoted.

Helio	1	3) Platform V.2.0	3) Platform V.3.0 more robust to support a high volume of users	Multiple technical issues, inability to scale	Actuating response, ex-post, locus of controllable internal, then pivoted.
North Start	2	1) Photomedicine solutions in a B2C model to a multi-sided platform 2) Exclusive users	1) Photomedicine solutions multi-sided platform 2) Standard users with medical guidance	1) The offering was not well-valued by potential customers 2) Unfeasibility of customizing the product without medical assistance, inability to scale	1) Actuating response, ex-ante, locus of controllable internal, then pivoted 2) Actuating response, ex-ante, locus of controllable internal, then pivoted
Orion	1	Data intelligence and performance analysis services for niche-product firms offering (chemical, pharma)	Data intelligence and performance analysis services for multi-industry firms (e.g., academics, law, manufacturers, pharma, etc.)	Low sales, inability to scale, resource depletion	Initially: inerting response, ex-ante, locus of uncontrollable external, then persist. Finally (after resource depletion): actuating response, ex-post, locus of controllable internal, then pivoted.
Pegasus	3	1) ERP synchronization system provider 2) Insurance management system provider 3) A cross-platform digital content manager	1) Insurance management system provider 2) A cross-platform digital content manager 3) DOOH and digital signage systems provider	1) Partnership problems 2) Unfeasibility of selling the insurance system 3) Competitors entry, loss of clients, and revenue	1)Actuating response, ex-post, locus of uncontrollable external and controllable internal, then pivoted. 2) Actuating response, ex-post, locus of uncontrollable external, then pivoted. 3) Initially: inerting response, ex-post, locus of uncontrollable external. Finally (after the identification of another potential failure): actuating response, ex-ante, locus of uncontrollable external and controllable internal, then pivoted.
Phoenix	1	Productivity manager in a B2C model	Productivity manager in a B2B model	Low customer retention rate and drop in the number of downloads of the app.	Actuating response, ex-post, locus of controllable internal, then pivoted.
Pleiades	1	Leisure planning services	Market analysis services	High acquisition costs, financial constraints, team exhaustion	Initially: inerting response, ex-ante, locus of uncontrollable external and controllable internal, then persist. Finally (after financial constraints and team exhaustion): actuating response, ex-post, locus of controllable internal, then pivoted.
Polaris	4	1) Electronic labeling provider 2) Customized computational resources 3) Embedded design 4) Own servers	1) Digital signage provider 2) Shared computing resources 3) Targeting clients with internal design 4) Cloud computing	1) Poor sales, team exhaustion 2) Difficulties in maintenance work, team exhaustion 3) Difficulties in managing design services 4) Multiple technical complaints, inability to scale	1) Actuating response, ex-post, locus of controllable internal, then pivoted. 2) Actuating response, ex-post, locus of controllable internal, then pivoted 3) Actuating response, ex-post, locus of controllable internal, then pivoted 4) Initially: inerting response, ex-post, locus of uncontrollable external. Finally (after the identification of another potential failure): actuating response, ex-ante, locus of controllable internal, then pivoted.
Pyxis	2	1) Highly complex predictive marketing tool with multiple services 2) Predictive marketing services provider	1) Simple predictive marketing tool 2) Digital privacy services provider	1) Loss of major customers, investor problems, inability to scale 2) Abrupt loss of revenue (pandemic-related)	1) Actuating response, ex-ante, locus of controllable internal, then pivoted. 2) Actuating response, ex-post, locus of uncontrollable external, then pivoted.
Rigel	2	1) IT services assistance for B2C 2) IT services assistance for SMEs	1) IT services assistance for SMEs 2) IT services assistance for large corporations	1) High acquisition cost, team exhaustion, and the startup went bankrupt 2) Revenues dropped	1) Initially: inerting response, ex-post, and locus of uncontrollable external, then persist. Finally (after the venture went bankrupt and the founder met his new partner): actuating response, ex-post, locus of uncontrollable external and controllable internal, then pivoted. 2) Actuating response, ex-ante, locus of controllable internal, then pivoted.

Sirius	1	A platform for monitoring student performance in public schools	A platform for analyzing employee performance in large corporations	Financial constraints, improper use of the platform, team exhaustion	Initially: inerting response, ex-post, and locus of uncontrollable external, uncontrollable internal, then persist. Finally (after resources were depleted and the intervention of a third party, a former investor): actuating response, ex-post, locus of uncontrollable external, uncontrollable internal, and controllable internal, then pivoted.
Ursa	1	Last mile delivery services for B2C	Last mile delivery services for B2B	Financial constraints, the startup went bankrupt, competitors' entry	Initially: inerting response, ex-post, and locus of controllable internal, then persist. Finally (after resources were depleted and the entrance of a very aggressive player into the market): Actuating response, ex-post, locus of controllable internal, then pivoted.
Vega	3	1) Plastic producer for several SMEs 2) Manufacturer of industrial PVC products 3) Manufacturer of architectural products made from recycled plastics	1) Plastic producer for a large corporation 2) Manufacturer of architectural products made from recycled plastics 3) Enablers for industries closing the plastics cycle	1) Partnership problems 2) Team was becoming increasingly demotivated 3) Poor sales, unmotivated team	1) Actuating response, ex-post, locus of uncontrollable external and controllable internal, then pivoted. 2) Actuating response, ex-ante, locus of controllable internal, then pivoted. 3) Actuating response, ex-post, locus of controllable internal, then pivoted.

Source: created by the author.

6.2.1 Perception of Failure

The perception of failure refers to the way entrepreneurs notice or are aware of the existence of a failure. We identified two categories of failure perception related to the moment at which the entrepreneur recognizes the existence of the failure: *ex-ante* and *ex-post*. The former refers to a situation in which the entrepreneur perceived an incipient problem with his/her BM. In other words, the entrepreneur is able to anticipate a failure. We found 17 cases in which entrepreneurs perceived the failures as *ex-ante* (as shown in Table 9).

We found that in *ex-ante* cases, the entrepreneurs adopted a foresighted attitude and were able to identify potential problematic situations that could lead to an *ex-post* failure. The case of Andromeda illustrates this situation. The startup began offering logistics services for companies in the legal sector. The operations consisted of connecting, on the one hand, companies that required collection and delivery services of certified documents and, on the other hand, couriers. However, with the increasing digitization of official paperwork in Notaries and other public offices, Jim (co-founder) realized that their offering might no longer make sense in the medium term, and some actions should be adopted. Jim explains

> *I thought that with the digitalization of the economy, document management in a way . . . I understood that it would mean that at some point, the company would naturally cease to exist. . . . So I started looking around at what other*

> *opportunities could work on our platform. . . . I looked at the food delivery, . . . e-commerce delivery, the auto centers, . . . and so on.*

On the contrary, *ex-post* refers to a situation in which the entrepreneur acknowledges the *de facto* existence of a failure in the current BM. In this category, failures were reported in concrete ways, such as a drop in sales, an increase in acquisition cost, or loss of funds. We found 22 cases in which entrepreneurs perceived the failures as *ex-post* (see Table 9). In some cases, *ex-post* failures limited the time for entrepreneurs to analyze the situation, leading to a sense of urgency. We observed this in four cases: Aquila, Betelgeuse, Fornax 2, and Polaris 2. In these cases, the entrepreneurs acted in this way: they gathered their team, exposed the situation, and emphasized the criticality and need to take imminent action. Sixto (Aquila) provides some evidence on this:

> *We sat down to have this discussion about: what do we do, close the company, not close it? . . . Then I said: We have no more money! We have money already invested, put on the table, but we are not generating revenue. We have to decide now. Money was the main indicator. We followed other metrics, such as commercial goals, marketing, and operations goals, but the company wasn't making money; that was the main one* [indicator].

In a nutshell, perception of failure provides four elements that contribute to entrepreneurs understanding the failure: First, awareness of the capacity to *identify the failure in advance* or not. Second, awareness of the ability to *assess the severity* of the failure situation. Third, awareness of the *time and resources available* to take some actions to cope with the failure. Finally, a *sense of urgency* to take any action to improve the situation.

6.2.2 Attribution of Failure

The failure interplay is complemented by another fundamental consideration about the failure: what was the cause. Based on previous literature (e.g., Graham, 1991; Weiner, 1972, 1986), we regard *attribution of failure* as the process by which entrepreneurs determine the cause of a certain failure. Following Williams et al. (2020), we coded three categories of attribution: *external uncontrollable*, *internal uncontrollable*, and *internal controllable*. Nevertheless, our analysis indicates that these categories are not self-excluding, i.e., an entrepreneur may determine that a failure was due to more than one type of attribution. *External uncontrollable* refers to the causes that the entrepreneur considers are beyond his/her volitional influence and are strictly due to external circumstances outside his/her control (e.g., changes in demographics and market

preferences) (Graham, 1991). For instance, Paul commented that the second pivot of Pyxis was a result of the Covid-19 pandemic:

> *In the meantime, the pandemic broke out. And by February . . . well, we started to be affected in January by the pandemic, because we had a contract with a supplier, . . . but we had to cancel the contract, because this supplier produced everything in China, and China at that time was paralyzed. So there was no more stock, and it was not producing anything to sell. So we started to lose revenue, and by the end of March, the revenues were already much lower than what we had before.*

More interestingly, in all cases in which entrepreneurs opted to persist rather than pivot when faced with a failure, they attributed the failure to uncontrollable external causes. For instance, Joe (Sirius) argued that aspects such as corruption and other cultural issues caused the failure situation: "*Here, we have mismanagement, corruption, a dilapidated school system, the teacher is poorly paid, these things . . . . In this country, the culture of corruption is very deep-rooted . . . . But why this [Sirius] didn't work? Because the public authorities in Brazil are used to receiving perks, they are not worried about the children*." Similarly, Thiago (from Rigel) claimed that aspects such as lack of trust and adherence to technology contributed to the emergence of the failure:

> *When I started this company, Uber and Airbnb were just starting up in Brazil, so people still didn't have the confidence to hire services from strangers. . . .At the time, . . . the main discussion was security, it was like: how am I going to get into a stranger's car, . . . how am I going to let a stranger into my house.*

This situation predisposed the entrepreneurs towards persisting in the current entrepreneurial orientation (albeit failed), a situation that may be related to the loss of the agency capacity linked to the framing of "uncontrollable" causes for failure (Weiner, 1986).

Internal uncontrollable refers to the causes the entrepreneur considers as intrinsic to him/her (personal), nevertheless, out of his/her control (e.g., lack of ability, immaturity) (Weiner, 1986). The case of Sirius further provides some evidence of this category. Joe (Sirius) partially attributed the failure to his own immaturity at the time to run a business: "*I was 29 years old and too immature to start a business and make several decisions*." We found that in all the cases where entrepreneurs attributed the failure to internal uncontrollable causes (i.e., Sirius, Centauri 1, and Pleiades), they also attributed the failure to external uncontrollable.

Conversely, *internal controllable* causes are those that the entrepreneur considers as intrinsic to him/her (personal) and that he/she could control (e.g., poor strategic choices, poor

process performance, or lack of effort). According to Weiner (1972), the focus of the cause is placed on the process and effort rather than "innate conditions." Therefore, individuals consider that the failure situation is plausible to be controlled. We found plenty of cases in which entrepreneurs attributed the failure to their poor strategic choices (e.g., Beta (1), Phoenix), poor process performance (e.g., Centauri (1), Helio), or lack of effort (e.g., Vega (2), Aquila). For instance, Sixto (Aquila) commented that one of the causes of the drop in sales was their lack of customer support after purchasing the product; he explains: "*For example, in the beginning, we sold something to the client, delivered it, and dropped it. We left it alone, and [if something went wrong] the client didn't know what to do with it, it didn't generate any value, it was chaos!*"

We observed that when entrepreneurs attributed failures to internal controllable causes, they were more oriented to think of alternatives they could do to improve the scenario. For example, during the first pivot of Centauri, both co-founders attributed the failure to internal controllable aspects. Mario pointed out that what led them to be in a critical situation was their "*lack of focus*" and that "*they did not listen well to their customers*." Meanwhile, Bob claimed that "*I rather believe that our execution was not correct*." Then, the startup founders decided to find a way to assess their BM by skimming which elements of their model were working and which were not in order to finally focus on what really brought value to stakeholders. We found more evidence of this orientation in the case of Beta. Lina (Beta 1) indicated that at the beginning of Beta, they disregarded the fact that people were unfamiliar with discount schemes, so their new proposal was generally not well accepted. However, Lina and her partner framed this situation in this way: "*It was a matter of educating both sides; on one side the users to use the coupon, and on the other side to educate the stores to create coupons and to accept coupons*."

Yet, attributing failure to internal controllable causes appears to be facilitated when analyzed in retrospect. To put it simply, during their daily journey, entrepreneurs may be unaware of their wrong choices or bad performance (i.e., internal controllable causes). The case of Orion provides some evidence in this regard. When inquired about the reasons for the venture's failure (in this case, linked to the product's scope), Tom (co-founder) answered: "*Looking back, I think we didn't have good assumptions and indicators about our business. But from an ex-ante point of view, when we were there, it seemed that we did."* Moreover, we identified that biases such as design fixation or psychological ownership could have hindered the attribution of failure analysis. As Tom points out: "*But the problem is that you create that business, and you become so confident in your creation. But nowadays, I see that no, those were not the right hypotheses*."

6.2.3 Failure Response

We identified two types of responses resulting from the failure interplay: *actuating response* and *inerting response*. The responses are associated with how necessary the entrepreneur considers that a given failure situation needs remedial action. To explain these responses, we draw on Goos (2002), who identified that when faced with a failure, some students decided to '*raise a red flag*' and take any corrective action while others did not.

Similarly, we identified that, when faced with a failure, some entrepreneurs were able to signal a remedial action, while others did not. Therefore, we point out that a failure per se does not lead to remedial action—that eventually could end up in a pivot—instead, it was necessary to raise a red flag. Based on this, we elaborated the concept of *actuating response* (i.e., the red flag is raised) and *inerting response* (i.e., no red flag is raised). The *actuating response* encourages entrepreneurs to take some concrete actions because they perceive the failures as something urgent, significant, and that must be addressed. Moreover, entrepreneurs tend to consider that they can improve the situation through their agency. We identified 27 cases in which the failure triggered an immediate actuating response (see Table 9). For instance, in the third Vega's pivot, after perceiving a failure, the entrepreneurs decided to focus their efforts on improving the situation. In this case, the failure involved two main aspects; on the one hand, their potential customers did not conclude business and seemed not to show much interest. On the other hand, team members were demotivated because the business was increasingly being reduced to sourcing recycled plastic architectural products, leaving aside the social purpose that, among others, motivated the second pivot of Vega (see more details in the case described in Figure 34). Yet, the team had an actuating response, as Martin explained:

> *Then we sat down again, and we questioned ourselves about what was going on. Then, analyzing, we realized that we were in a very linear system: a system where we take a material, transform it, and dispose of it. And that system is broken, it's a system that creates a very short life cycle, and nature today doesn't follow our rhythm . . . . So from a linear economic model, we realized that a circular economy model was healthier. It makes the most sense. So we started to ask ourselves how everything is related, and what we can do. And there we began to reformulate* [Vega]*, to rethink ourselves.*

Inerting response informs about situations in which no red flag was raised; thus, no action was taken. However, we observed that the inerting response occurred only temporarily in all the pivot cases studied. After certain events (e.g., financial constraints, team exhaustion), the entrepreneurs finally shifted to an actuating response, leading to pivoting. In our sample, 12 cases

presented that pattern (see Table 9): Entrepreneurs had an inerting response characterized by a loose perception of the failure and did not take any action. However, it was until the intervention of a third party (e.g., Alpha, Beta 1, Pleiades), the identification of another *ex-ante* failure (e.g., Polaris 4, Pegasus 3), team exhaustion (e.g., Sirius, Carina), the rapid loss of resources (e.g., Rigel 1), or a combination of the four (e.g., Orion), that entrepreneurs finally raised a red flag and shifted to assuming an actuating response.

For instance, Nando revealed that before the third pivot of Pegasus, they had already started to identify signs indicating failures, such as the "*main projects that guided the investment group went down the drain*" or the "*bankruptcy in the 2008 American crisis*" of one of the main potential customers. However, Nando did not pursue any alternative course of action. On the contrary, the startup persisted in the hope of being acquired by an incumbent company and being benefited by having the lowest selling price in the market. However, all of that changed when the incumbent company withdrew the purchase offer, and "*a national competitor came along and offered 10% of our price*" (Nando). Then the entrepreneur shifted to an actuating response.

To summarize, during the failure interplay, entrepreneurs make sense of the failure by perceiving it and attributing the causes that led to that problematic situation to ultimately determine a response against it. This response will have an effect on the beliefs related to the failed element(s) of the BM, which is addressed in the next section. Table 10 provides additional evidence for the identified themes of the failure interplay.

Table 10 – Illustrative quotations for failure interplay

Aggregate Dimensions	**Second-order Themes**	**First-order Themes**	**Examples from data**
Failure interplay	**Perceiving failure**	*Ex-post*	"The problem was that those repair shops were not paying us for those customers we were bringing to them; and besides, when the car arrived at the repair shop, we lost all control of the operations." Bob (Centauri) "This middle of 2019 was very difficult for us. We lost a lot of revenue; from one month to the next, we lost around 20% of revenue." Paul (Pyxis) "The agency that takes care of and regulates the insurance companies in Brazil, unfortunately, intervened in the insurance company, and that's f**ked up all." Nando (Pegasus)
		Ex-ante	"I thought that with the digitalization of the economy, document management in a way . . . I understood that at some point, the company would naturally cease to exist." Jim (Andromeda) "you saw it wasn't going to work, you as the owner of the company, you already felt that in that direction, you were going to hit the wall again, and as we had hit the

			wall 3 times before, my radar was super hot." Thiago (Rigel) "But we realized for a second time that if we were going to be a licensing company, it wouldn't live up to our expectations. Because here in the country, the licensing culture is a very complicated one." Danilo (Antares)
	Attributing failure	External uncontrollable	"At that time . . . what we had in our catalog were the most expensive restaurants because they were also the restaurants that had the margin to pay for the whole process, which was super costly. So, the business was very restricted, very difficult." Beto (Carina) "Just then, this insurance company [with which the startup worked] changed its shareholders' control and fell into the hands of some crooks, and the guys started scamming with the government" Nando (Pegasus) "Then the pandemic came, which remarkably affected my main customers" Marco (Fornax)
		Internal uncontrollable	"I was 29 years old and too immature to start a business and make several decisions" Joe (Sirius) "What happened is that we were incapable because we didn't have the wisdom, the capacity, or the patience, I don't really know why" Mario (Centauri 1) "We were very hardheaded; it was very difficult for us to say: let's change our business idea" José (Pleiades)
		Internal controllable	"So, in my vision, I believed it wouldn't make much difference, but it certainly did, I didn't realize it" Thiago (Rigel) "But to educate both sides [consumers and stores] takes a lot of time, and it takes a lot of testing of communication, and maybe we didn't do it right in the beginning." Lina (Beta) "For example, in the beginning, we sold something to the client, delivered it, and dropped it. We left it alone, and [if something went wrong] the client didn't know what to do with it, it didn't generate any value, it was chaos!" Sixto (Aquila)
	Failure response	Actuating response	"We sold 30% of what was planned, . . . this situation sent out a warning signal" Marco (Fornax) "This is when we started to think that we should do something different. We wanted to start something that would have some impact." Martin (Vega) "Our App was very crappy, . . . and we knew the importance of the App, but we didn't know how to execute it. So, we knew that we had to do something about it" Lina (Beta)
		Inerting response	"So, I wasn't even thinking about pivoting. What goes through the entrepreneur's head, I think it's more of a movie like: let's try a little bit more, you need to be resilient" Joe (Sirius) "All that stuff [the failure that the consultant anticipated for Orion] kept swirling around in my head, I didn't agree at the time, not at all. and I've been thinking, but how is it [Orion's BM] not good? and then I kept on with it" Bia (Orion) "After that, we were very afraid of making any changes, everything was too complex for us, and we didn't." José (Pleiades)

Source: created by the author.

6.3 EFFECT ON BELIEFS

According to the entrepreneurial judgment theory, judgments are made based on beliefs (Foss et al., 2019; McCann, 2017). However, beliefs do not always remain immutable over time. Often, new information unleashes belief updating processes allowing judgments better suited to a given context to be made. Nonetheless, biases and aspects such as the psychological immune system (Porot & Mandelbaum, 2020) prevent the beliefs from being updated and, on the contrary, may cause the reinforcement of the belief (even against factual evidence). Drawing on these arguments, we propose that the failure interplay has an effect on the belief (more precisely, the opportunity belief). Accordingly, the actuating response will lead to *belief updating* and inerting response to *belief reinforcement*. Although these two processes occurred differently in the cases, our analysis identified the underlying events from which we elaborate our general process. We will present the belief updating and belief reinforcement processes in the following.

6.3.1 Belief Updating

According to Morais-Storz et al. (2020), to shift the trajectory in an innovative process, a reformulation of the problem needs to be done. Similarly, our findings suggest that entrepreneurs should undertake a process for reformulating the belief about the failed aspect of the BM. We referred to this process as *belief updating*. We identified ten events that comprise the process; however, the occurrence and sequence of these events occurred differently among the cases (e.g., in some cases, not all ten events occurred). In order to pinpoint how belief updating varies, we plotted the sequence of events for updating the belief in each of the 39 pivot cases analyzed (Figure 42).

Figure 42 – How entrepreneurs updated the beliefs

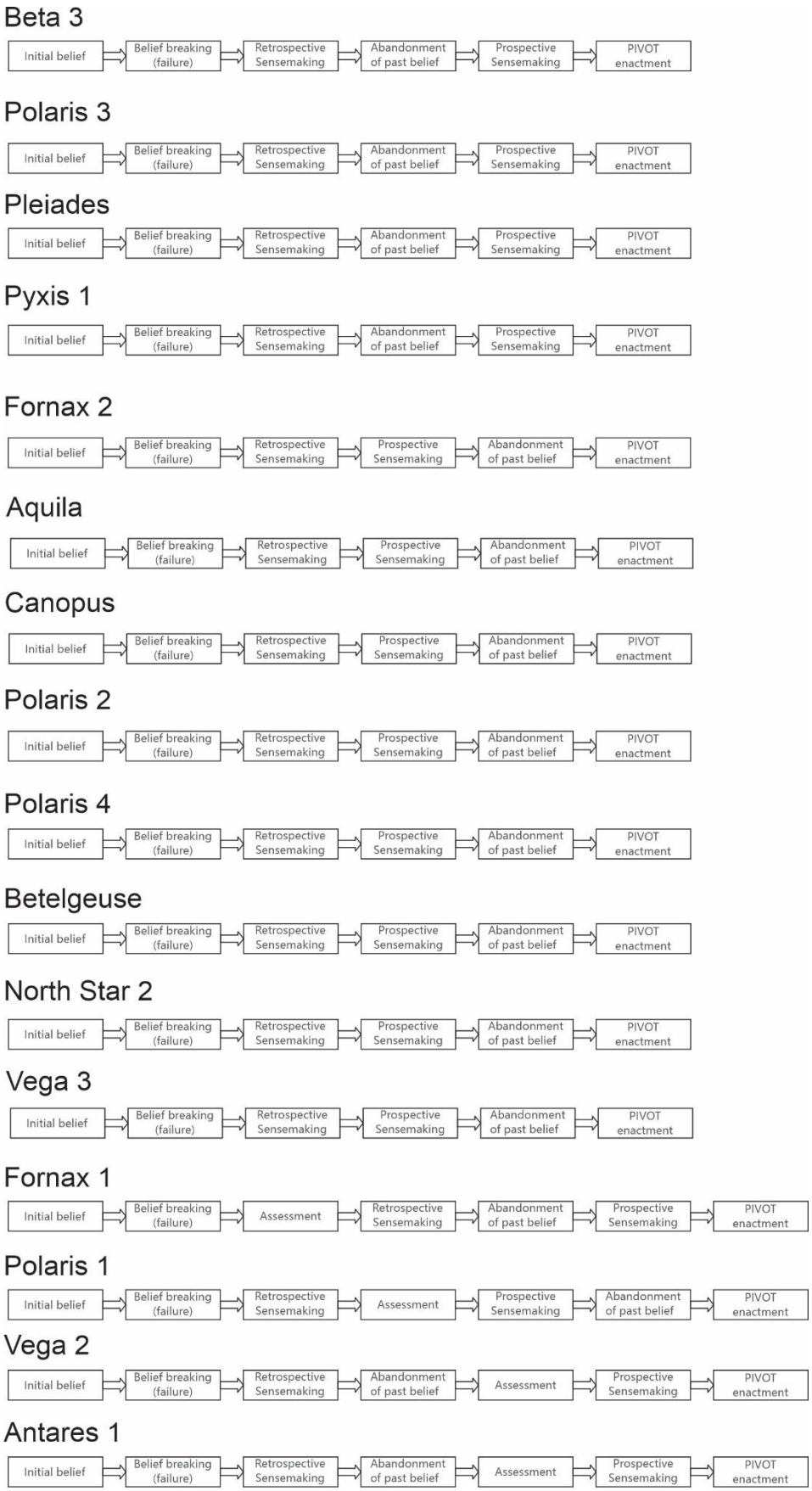


Figure 42 – How Entrepreneurs Updated the Beliefs (continued)

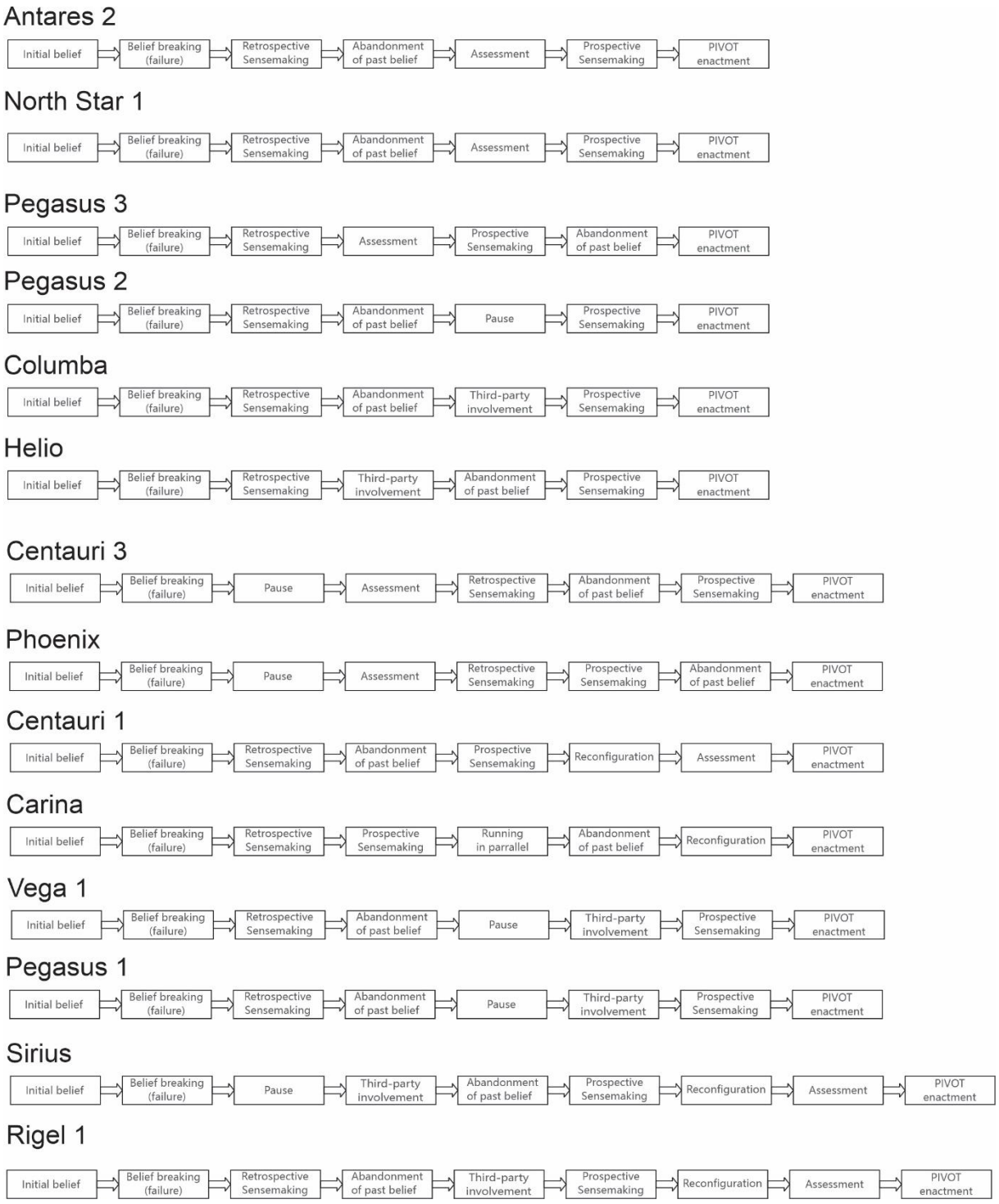
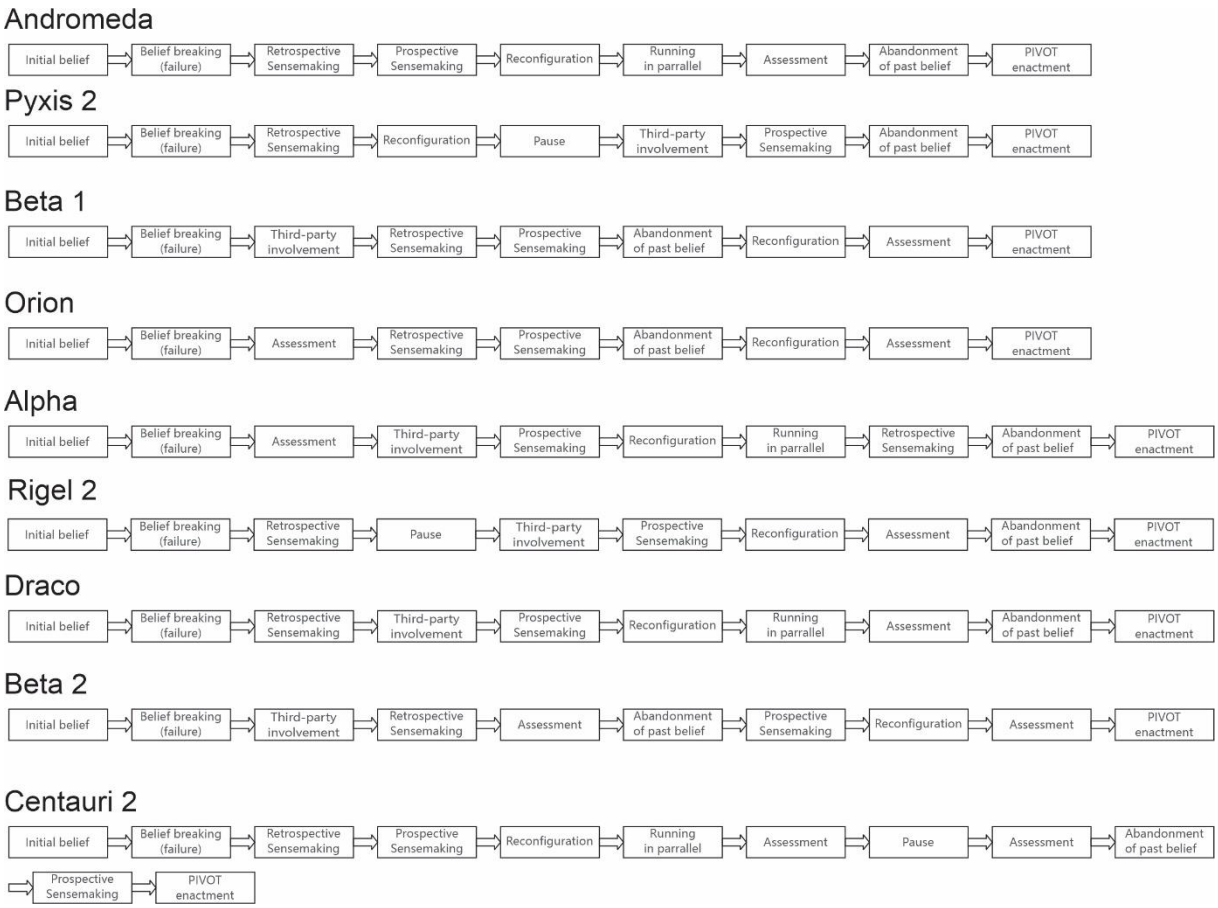
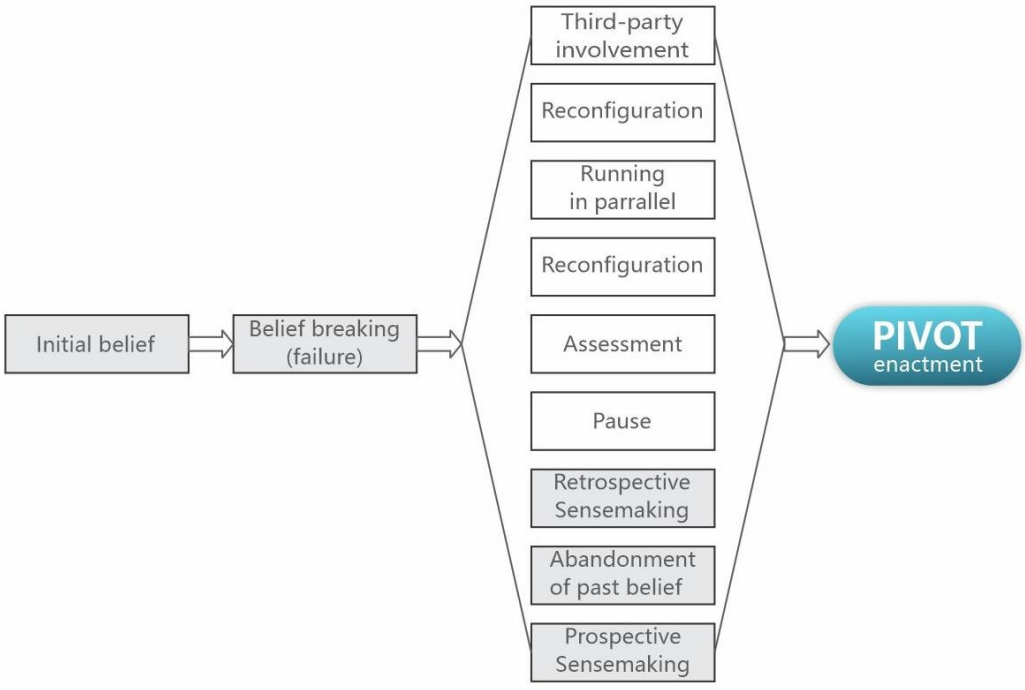


Figure 42 – How entrepreneurs updated the beliefs (continued)



Source: created by the author.

Figure 43 – The belief updating process



Source: created by the author

Despite the diversity in the sequence of events (there were identified 25 different ways in which events were chained together for belief updating), we found five events present in all cases: initial belief, belief breaking, retrospective sensemaking, abandonment of initial belief, and prospective sensemaking. We then synthesize the sequence of the belief updating process events in Figure 43; the gray boxes correspond to the events present in all cases.

The *initial belief* corresponds to the original OB on which the entrepreneurs perform the validation checks and begin to execute the first business operations. Naturally, all the cases initiated with an opportunity belief that comprises several aspects regarding how to create, deliver, and capture value and eventually change utterly or partially after the pivot. Therefore, we were able to distinguish an initial and a final belief after the occurrence of the pivot. To provide an example, the initial belief of Polaris was "*to provide RFDI* [Radio-frequency identification] *solutions to retailers . . . . One of the products we offered* [e-labeling] *was electronic labels*" (Roger). Identifying the initial belief was crucial because it allows us to grasp the entrepreneur's expectations and challenges before the pivot. Likewise, understanding the final belief approached us to find out how the pivot reconfigured (or updated) the initial belief. We provided more illustrative quotations for all the constructs and themes in Table 11 at the end of the section.

The *belief breaking* refers to the moment in which the initial belief proves troublesome or inadequate. Our findings indicate that the belief breaking is triggered by a failure or potential failure of one or more elements of that initial belief and is perceived and attributed during failure interplay (section 5.3.1). Belief breaking, therefore, was also expressed in terms of negative situations that prevented (or could prevent) the startup from growing. For instance, Tom (Orion) asserted that "*One event that was key for me to realize this [that the belief was flawed] was that when the investment process was being closed, we didn't meet several indicators of progress, so this taught us a big lesson*." Likewise, Simon (Canopus) commented:

> *And that was the day I felt that the way wasn't that way. That was the D day, that I got back in the car and told my partner: man, we keep insisting on getting into these* [IT] *people, but they don't understand what we are proposing, and we will not have an opening in the companies*.

From this point, we identified that the entrepreneurs took different sequences of events for the belief updating, as shown in Figure 42. For instance, while in cases such as Centauri 3 and Sirius, the entrepreneurs decided to take a pause after the belief breaking, in cases such as Fornax 2 or Beta 3, the next event was retrospective sensemaking.

The *retrospective sensemaking* was characterized by entrepreneurs reflecting on what was occurring, why the startup was not performing well, and what aspects of the BM were not working properly. Accordingly, during the retrospective sensemaking, the entrepreneurs seek to understand 'what happens,' 'why it happens' (i.e., the attribution of failure), and then usually formulate the question 'what to do now' (in line with Morais-Storz et al., 2020). For example, Thiago (Rigel), narrating the events that occurred with his company in 2015, remarks:

> *At the end of 2015 the company was doing super bad, I was getting a good volume of calls, but on the other hand I was having a lot of troubles with my partners and I was having a lot of problems with clients. . . . I had a technology partner, who was very slow, and couldn't finish the platform which had a lot of problems, so I lost a lot of users. . . . at the end of 2015, I had a fight with my partners . . . and then the company went bankrupt. . . . then I thought what I should do, but it was a collapse for me.*

Retrospective sensemaking is a critical event in pivot decisions: a poor retrospective analysis can lead to the right solution to the wrong problem. There are cases in which the entrepreneur concluded that the problem was rooted in the product, but in fact, it was the misfit of the product and the market (e.g., Orion and Sirius).

In some cases (e.g., Polaris 3 or Pleiades), after the retrospective sensemaking, the entrepreneurs opted to *abandon the initial belief*, in other words, relinquishing the initial belief about that element (or elements) of the BM that has been framed as problematic. In line with Wood and McKinley (2010), the abandonment of initial belief involves two instances: a deviation of attention from a certain belief and the decision to no longer pursue it. A quotation from Bruna (Phoenix) illustrates this: "*I thought that this way was not the best way. I mean, this structure, how we had framed our service. So I thought, if we move in this direction, we will get all these things that I want; something that solves the problem, that is scalable, and that people can afford*."

However, some cases required *third-party involvement* to deflect attention from the initial belief. In these cases, a third party (e.g., an investor, a client, or an accelerator)

actively intervenes in the entrepreneurial decision-making process by making suggestions or submitting proposals. Sirius's case illustrates this situation:

> *At that point,* [after retrospective sensemaking and running out of resources] *I told Milton that I didn't know what else to do and was thinking of dissolving the company . . . . Then he said: no! you are not going to dissolve this man, let's try a little more, let's do the following; let's change the focus . . . let's think about something else.* (Joe).

Additionally, in some cases (e.g., Pegasus 3, Phoenix), to abandon the initial belief, the entrepreneurs made some *assessments* such as interactions with customers, pilots of some functionalities, or market experiments to identify more precisely the failed aspect of the BM. Moreover, such assessments even contributed to setting a new direction and updating the belief. Phoenix illustrates this event: "*Then we took this feedback, which was actually very repetitive, saying that they* [the clients] *needed the business to work in an integrated way with other people . . . . And these users eventually led us to this insight of expanding to companies and work teams*" (Bruna).

Similar to previous studies (e.g., Earle et al., 2019; Kirtley & O'Mahony, 2020), we found some cases (e.g., Centauri 1, Pegasus 2, and Pyxis) in which entrepreneurs made a pause or a temporary stop in operations. This *pause* was made either to analyze the information and decide which BM elements to abandon or to think about a new direction, as Nando (Pegasus 2) explains: "*And so, without really knowing what to do, we stopped operating, I didn't know what to do, but I only knew that I didn't want to do what I was doing with this colleague anymore*."

We label setting a new direction as *prospective sensemaking*, an event in which the entrepreneurs establish an alternative belief with the potential to improve the failing situation. We noted that often this event was described by informants with relative enthusiasm and can be regarded as one of the entrepreneurial "aha moments." For instance, Joe from Sirius said: "*OMG that is! I just need to change all those things that are focused on teachers for managers. So, I'll redirect the platform towards an organizational structure*." Similarly, Bruna commented: "*And then we said: oops, this is the way!*" Similar to retrospective sensemaking, prospective sensemaking occurred differently among the cases.

For instance, our study identified 14 cases in which the involvement of a third party was necessary to promote prospective sensemaking. In these cases, third parties act by encouraging the entrepreneurs to find alternative courses of action (e.g., Vega 1,

Columba), by suggesting an alternative course explicitly (e.g., Alpha, Beta 1, Beta 2), or by serendipitously persuading the entrepreneur to place an alternative course on his or her radar (e.g., Draco, Pyxis 2). To illustrate this, Alan from Draco, after identifying that their current model would be extremely difficult to scale up, held a conversation with a friend and CEO of a major retailer of sports products who expressed interest in Draco's solution. Therefore, Alan raised awareness regarding the possibility of serving big corporations, in his words: "*And then we immediately realized: Wow, there is a huge gap here for attending big companies*."

Furthermore, prospective sensemaking may involve deductive or experimental reasoning (as suggested by Boddington & Kavadias, 2021). Pegasus 2 provides an example of how the entrepreneur starts from a holistic understanding and makes a deep recall or scanning of past situations by employing 'deductive reasoning.' Here the entrepreneur (Nando) made several connections between past experiences (which sectors were or were not more attractive) and scanned which technologies were emerging and could dominate the market. In this way, Nando was able to conclude that the insurance sector was no longer favorable. On the contrary, the advertising and marketing segment seemed more promising. He also concluded that digital platforms together with the simultaneous use of devices by the same user, were the way to establish a new course of action. On the other hand, Antares provides an example of the use of 'experimental reasoning.' Here, after setting a vague direction on their radar, the entrepreneurs conduct a series of experiments to filter and further specify the new course of action. That was the case of Antares, in which Danilo performed a series of experiments to explore the market while looking for applicable scientific knowledge at universities and laboratories to define the most promising direction for the startup.

In addition, we found five cases (Centauri 2, Draco, Alpha, Andromeda, and Carina) in which, after prospective sensemaking, entrepreneurs *run in parallel* two or more courses of action to determine which alternative would be the most suitable. For instance, in the Andromeda case, the entrepreneurs decide to assess in parallel three alternative beliefs (legal documents delivery, food delivery, and auto parts delivery) to adapt their platform. Jim explains: "*So I started looking around at what other opportunities could work on our platform. . . . I looked at the food delivery, . . . e-commerce delivery, the auto centers, . . . and so on.*"

However, in order to conduct these parallel assessments, the startups had to make some *reconfigurations* (i.e., rearrangements of the BM elements) in various aspects

ranging from changes in the work team (e.g., Carina), the offering (e.g., Alpha), internal processes (e.g., Andromeda), and type of customers (e.g., Draco). These reconfigurations required the investment of resources; therefore, it is not a trivial decision. On the contrary, it requires an exercise of analysis that results in the most efficient management of resources. The Andromeda case also provides evidence of this:

> *However, we tried not to make major modifications to our model; what we tried to do was to make small adjustments, basically some modifications to make the model suitable to evaluate the alternatives. But in general terms, the operation was practically the same. For the food delivery, we did make some drastic changes, but we didn't get into the medicine delivery that required more regulation, for example. (Jim).*

Finally, the belief updating process culminates with the *pivot enactment*, an event in which entrepreneurs formally signalize the decision to pivot their ventures to their stakeholders. Canopus case illustrates that event: "*So that was it, from then on we configured our strategy to attack the market by the business areas. . . . and then we went to where our customers, first to our main customer, and communicate how we will operate now, and we didn't go to IT area, rather we went to the business area focused on news recommendation*" (Simon).

The *pivot enactment* entails the construction of a narrative that explains the facts that lead to this determination (Powell & Baker, 2012). The pivot enactment also may bring further reconfigurations of the product and other aspects of the business model. Indeed, these reconfigurations may raise resistance that needs to be addressed like any other organizational change process (in line with van Marrewijk, 2018). We found evidence of this fact in Pyxis case. When the entrepreneurs decided to enact the pivot of changing their product and strategy by eliminating their most complex product in favor of the most scalable one, they were quickly confronted by veteran employees. These employees questioned that decision, as the complex product was responsible for 80% of the revenues. The situation became so unsustainable that the co-founders decided to fire the opposing employees. However, due to the very strong relationships developed with these people, this decision was very difficult for Paul (co-founder). The entrepreneur manifested severe physical and mental health problems as he described: "*My partner and I decided to fire them, and it was too heavy for me . . . . Firing these people was very stressful because they were my friends, they were very close people. And from one month*

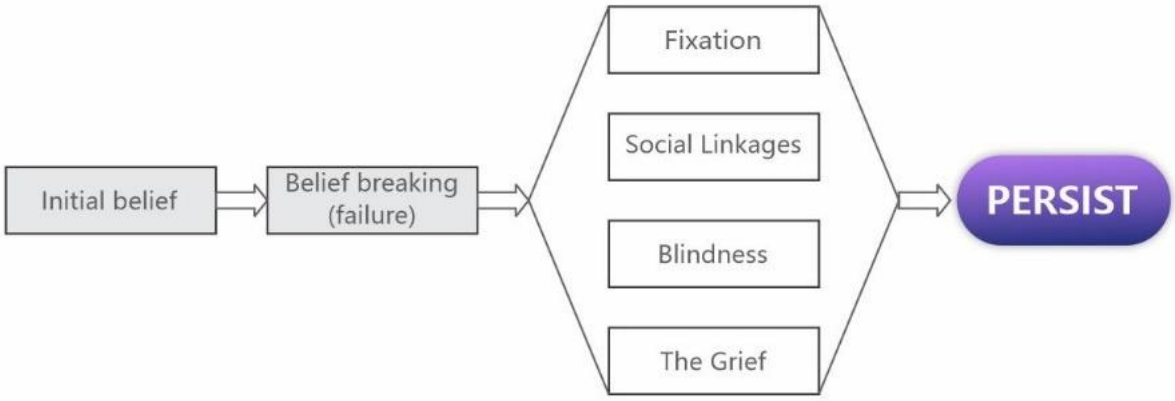
to another I gained 15 kilos, just from stress. Gaining all this weight caused a fracture in my chest."

Belief updating is an essential process for pivoting. It is a complex process that demands a lot of effort and resources. Our interest in defining and delimiting this process is due to the fact that it ultimately enables us to open the judgment "black box" and better understand how the entrepreneur's beliefs, external information, analytical skills, and ability to make sense of what is occurring interact with each other and contribute to establish and formalize an alternative course of action to improve the failure situation. However, aspects related to the bounded rationality (Staw, 1981; Tversky & Kahneman, 1974), cognitive biases (e.g., psychological ownership, fixation, blindness, fear of failure), the psychological immune system (Porot & Mandelbaum, 2020), and lack of experience (Picken, 2017), may lead to disregard the failure (although it actually exists) and cause the reinforcement of the belief. This alternative course of action is presented in the following section.

6.3.2 Belief Reinforcement

Drawing on previous studies (Jelalian & Miller, 1984; Slusher & Anderson, 1989), we defined *belief reinforcement* as entrepreneurs' biased response to failure in which they persist in the initial flawed belief. Surprisingly, authors such as Slusher and Anderson (1989) have attested that such behavior is more the rule than the exception; for instance, among the scientific community, "there is a tendency to defend an established theory in light of considerable discrepant evidence (Slusher and Anderson, 1989, p, 17). Likewise, our findings provide evidence of entrepreneurial belief reinforcement. In total, we identified five cases (Orion, Sirius, Pleiades, Rigel 1, and Ursa) in which the entrepreneurs preferred (in the first instance) to reinforce their beliefs rather than pivot.

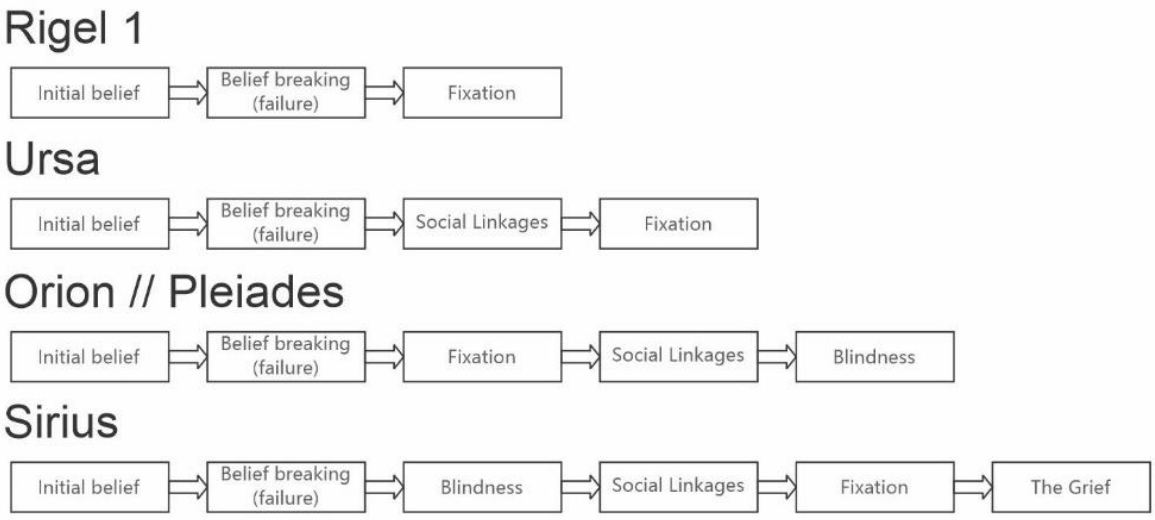
Figure 44 – The belief reinforcement process



Source: created by the author

Like the belief updating process, belief reinforcement (Figure 44) starts with the *initial belief* and *belief breaking* (failure). Both events occurred in all the cases analyzed. However, the following events occurred differently among the cases, as shown in Figure 45. Yet, in all the cases, the entrepreneurs finally opt to persist in the initial belief, thus preventing them from seeking alternatives to modify the belief and improve the failure situation.

Figure 45 – How entrepreneurs reinforced the beliefs



Source: created by the author

Our findings suggested that entrepreneurs often are under the influence of several cognitive biases, which ultimately lead them to persist in a failed belief. Biases on entrepreneurship have been extensively studied previously; therefore, we categorized some of these biases into two major groups that strongly influenced the reinforcement response. The

first group comprises confirmation bias (Jelalian & Miller, 1984; Mandelbaum, 2014), design fixation (Crilly, 2015; Kershaw et al., 2011), psychological ownership (Grimes, 2018; Pierce et al., 2003), and escalation of commitment bias (Brockner, 1992; McCarthy et al., 1993; Staw, 1981). Taken together, these biases have in common an intense attachment to a particular idea, which prevents the individual from even contemplating alternative reasoning. We label this group as *fixation*. Beta 2 provides an example of this. In that case, although the accelerator had warned about the inconsistencies between the value proposition and the corporate image—a situation that could lead to a shrinking of the market—the entrepreneurs continued to persist with their brand as Lina stated:

> *We were very attached to the brand . . . . We made a lot of resistance to changing our visual identity because we thought we were too well-known. At that time, we had about 400 thousand users. And we thought that at this level, we couldn't change our visual identity. So we put a lot of resistance.*

Similarly, Lucas (Columba) commented that they felt very attached to the initial idea, which consisted of providing the software and a physical device to manage the waste. However, the rising cost of producing such devices made the offer unfeasible as it stood. Lucas explained:

> *It was complicated* [reframing the OB]*, because we were really focused on this sensor, one year developing it, so we had a lot of things there, a lot of attachment. The prototype was already running, there was already an MVP at the university campus, and so forth.*

We found out that fixation may be stronger when the initial OB is intertwined in some way with the entrepreneur's life purpose, so core beliefs (i.e., those linked with the identity) hinder the withdrawal from the initial OB. The case of Sirius shows clear evidence in this regard. Joe, a son of teachers, was convinced that through education, he could positively impact the reality of his country (Brazil). Conversely, in Phoenix, the entrepreneur remarked that they "*did not have an emotional connection*" (Bruna), so leaving the first OB was fairly easy; in the words of Bruna: "*in my case, it was quite easy to change, I didn't resist, not at all.*"

The second group comprises mental inertia (Yu, 2012), influence effect (Ecker et al., 2011), and metacognitive blindness (Goos, 2002). We label this second group as *blindness*, which consists of the inability to recognize the failure of the OB and consider—or even formulate—alternatives for improvement. As the term itself suggests, blindness prevents the entrepreneur from identifying the failure and its underlying causes. Sirius provides a paradigmatic example. After perceiving a sharp drop in sales attributed to corruption and

economic crises, Joe devoted himself to trying to improve the platform, despite this not being the central issue. The entrepreneur explained:

> *The last few days I was stuck in front of my computer, looking at the platform, looking at the code and thinking what do I change here? I got into a kind of paranoia issue thinking about what to change in the platform, totally focused on that without seeing what's really going on.*

In some cases, blindness was reported as a situation of "imprisonment" that generates anxiety and stress, where the entrepreneur just does not know what action to take. Martin from Vega (1) illustrates this: "*For months I didn't know what to do, I didn't know how to proceed, and I had no money or economic resources to start something else . . . it was very frustrating.*"

Furthermore, we identified that in some cases, there was the influence of both groups (i.e., blindness and fixation). For instance, in the case of Orion, blindness was accompanied by signs of overprecision and psychological ownership reflected in statements such as "*but how* [my idea] *is not good, it's my baby, how come?*", "*for me, there is no bad project or bad idea*," "*and it was such a well-done product* [Orion's first product version], *done thoughtfully, you know?*." (These statements were said by Bia to exemplify her thinking during the pre-pivot period).

We also identified that some entrepreneurs decided not to pivot, attributing that pivots would affect their *social linkages* or the tight bonds between some stakeholders and the startup. In other words, social linkages are the relationships with third parties (e.g., investors, customers, audience, etc.) that entrepreneurs identify as extraordinarily important and difficult to replace in the case of loss as a result of pivots. Pleaides offers evidence of this. In the beginning, the startup received good media coverage, which contributed to the entrepreneurs' perception that their audience was very large and loyal, and partly influenced the decision to persist, in the words of José: "*We were in a lot of articles and media all the time, a lot of things appeared about our startup and about us, . . . and that weighed*." Social linkages are also related to publicness in which people perceive that "significant others" (e.g., familiars, peers) are aware of their role and actions (Kline & Lawrence, 2017; Salancik, 1977). This is again evidenced in the Pleiades case. José commented that his mother was very involved in the startup, and when he expressed the possibility of pivoting Pleiades, she seemed to disapprove of it. The entrepreneur said: "*my mother was very upset when she found out that we were not going to continue with the original idea of the company*."

Finally, we identified a critical situation in which the entrepreneurs went through a situation of deep grieving similar to the mourning caused by the death of a relative (in line with Mantere et al., 2013 and Shepherd, 2003). We coded this situation as *the grief*. Joe (Sirius) also provided evidence in this regard: "*You get lost, it's an emotional state that I think if you are not emotionally strong enough, you will succumb. It's like grief, eternal grief that doesn't go away, because that's the pain. It was exactly like grief; it feels as if something has died*."

The five cases that underwent belief reinforcement needed certain stimuli or triggers such as third-party involvement (e.g., Orion) or the exhaustion of resources (e.g., Ursa) to elicit behavioral change. These stimuli constitute our third building block: 'Moving from reinforcing to updating beliefs,' and will be detailed in the next section. Table 11 provides additional evidence for the identified themes of the effect on beliefs.

Table 11 – Illustrative quotations for effect on beliefs

Aggregate Dimensions	**Second-order Themes**	**First-order Themes**	**Examples from data**
Effect on Beliefs	**Updating beliefs**	Initial belief	"Andromeda's idea was a delivery solutions startup for notaries and companies in the legal sector" Jim (Andromeda) "What we wanted to be was a virtual community, a Facebook of vehicles." Mario (Centauri) "In the beginning, the product that I thought was this way: . . . final consumer with pain, would go to the pharmacy, buy the product, and apply it." Tim (North Star)
		Belief breaking (failure)	"Finally, we understood that the sensor didn't have the financial viability for the return that we expected from the project." Lucas (Columba) "The business was very difficult, it depended on our own logistics, . . . and we simply couldn't scale the business" Beto (Carina) "Our algorithm was a mess; it was taking too long to run, . . . and when we have 1 million truck drivers?" Caio (Helio)
		Retrospective sensemaking	"And at that time, what we wanted to do was, with the partners that remained, what we wanted to do was to understand what was happening" Mario (Centauri) "Then we started to have a lot of complaints, a lot! Then we realized that it was because we had launched our product too early, without being completely ready, you know?" Bruna (Phoenix) "We saw this: we have created a kind of Frankenstein with a series of products . . . . Our original product didn't exist anymore, we've created a monster, and that was really bad. . . . then we thought we should do something, remove precisely this part of the monster-product and revitalize other ideas" Paul (Pyxis)

		Abandonment of initial beliefs	"we completely abandoned our product, I mean, the hardware part." Sixto (Aquila) "The platform I had made with my former partners back in 2015, I threw it in a drawer and left it there, I lost a lot of money, but I had nothing else to do" Thiago (Rigel) "So, we ceased to manage our technology with this company . . . because we started to find several difficulties" Adal (Betelgeuse)
		Prospective sensemaking	"We understood that we needed to be a 100% verticalized company. We needed to have everything: from the raw material to the final product on the shelf, so we move on that direction." Danilo (Antares) "Then, we developed a digital medicine platform. We offer now a treatment against chronic pain" Tim (North Star) "That's when we came up with the idea of creating a solution that could be used by everyone, but on a single server, in order to share the resource." Roger (Polaris)
		Third-party involvement	"Milton told me . . . : let's start something else, let's change the focus of the business to not lose everything that was done here." Joe (Sirius) "He [the angel investor] said: I didn't put the money in the sensor, I put it in you. So find a way to make this project work." Lucas (Columba) "And we finally ended up selling only on flights because an airline told us that its problem was that it couldn't sell massively because it had a very precarious reservation system. So, it proposed us to be the manager of that reservation system and sell for it. So, we did it" Bill (Alpha)
		Running in parallel	"We started to look then at food delivery, . . . look also at using our motorcycle courier force in a logistics force in other markets" Jim (Andromeda) "We split the company in two: we divided the company into SMEs, and left it running in parallel . . . together with the big corps" Thiago (Rigel) "We started to run the 2 businesses in parallel . . . : So, I took care of the operations, more of the legacy, and the other partner took care of our new proposal" Beto (Carina)
		Assessment	"And then, I started looking for other sources, I came in contact with the university environment, . . . we started to do tests . . . and to look for partnerships" Danilo (Antares) "Then we reflected and started to test other versions there in the Valley . . . . We concluded that it was possible to do a cool different thing" Lina (Beta) "From our interaction with customers and from the participation in other programs and mentorships, we have better developed our canvas. For example, we identified that there are more opportunities in other sectors" Bia (Orion)
		Pause	"Then we said: let's stop, let's clean up, let's actually make a good product before we go back to the market, and then we can say: you guys [clients] can come!" Bruna (Phoenix)

		Reconfiguration	"And that was a totally different business model . . . . We had to start looking for spare parts, for repair shops, . . . to start creating the basis for a new business model." Bob (Centauri) "I no longer needed that technical language that I used to employ with the IT team, but I needed to speak the language of business. So obviously, you need to have another capability. In this case, it was supporting business performance, . . . and that's when I went to business school" Simon (Canopus) "Then I realized that we needed another partner. So, I went after a guy who knew . . . . Other investments were made in other equipment, and then we became more robust." Danilo (Antares)
Effect on Beliefs	**Reinforcing beliefs**	Initial belief	"The business idea was like this: our platform was going to be sold to the city halls, . . . who would buy the platform and who would implement it in the schools and municipalities." Joe (Sirius) "The idea I had back then was to build a platform that was more like an e-commerce, where I had IT services, and the idea was to create services in a language that my grandmother could understand." Thiago (Rigel) "In the beginning the model was that we would go to the physical markets to buy, and then take those purchases to our customers." Ben (Ursa)
		Belief breaking (failure)	"I can't get money from the bank because I am in debt, . . . I can't borrow money from anyone because no one will believe in the idea because of the city hall, because it is new and no one buys it" Joe (Sirius) "The company literally went bankrupt, I lost my partners, my whole team, and almost all the capital" Thiago (Rigel) "when it came time to close an investment process, we failed to meet several indicators of progress, so this taught us a big lesson" Tom (Orion)
		Fixation	"We had a lot of resistance to change our visual identity because we thought we were too well-known . . . . We were very attached to the brand." Lina (Beta) "It was complicated because we were focused on this sensor . . . One year developing, so we had a lot of things there, a lot of attachment" Lucas (Columba) "because in the beginning, you think your product is wonderful and don't need to change it" Bia (Orion)
		Social linkages	"We were in a lot of articles and media all the time; a lot of things appeared about our startup and about us." José (Pleiades) "For me, the hard part is what others say" Bia (Orion) "We thought: no, we can't do that, we have been with them [the small businesses] for a long time" Lina (Beta)

		Blindness	"For months, I didn't know what to do, I didn't know how to proceed, and I had no money or economic resources to start something else." Martin (Vega) "I couldn't see that the problem was not on the platform, and the problem was elsewhere" Joe (Sirius) "because whoever develops [a startup] has a passion, and we become blind." Bia (Orion)
		The grief	"You get lost. It's an emotional state that I think if you are not emotionally strong enough, you will succumb. It's like grief, eternal grief that doesn't go away, because that's the pain. It was exactly like grief; it feels as if something has died." Joe (Sirius) "I left with nothing; I left with no money, . . . I didn't know what to do for months. It was like grieving." Martin (Vega)

Source: created by the author.

6.4 MOVING FROM REINFORCING TO UPDATING THE BELIEFS

In the group of cases in which entrepreneurs first opt to persist, we identified the mediation of four types of triggers that enabled the entrepreneurs to move from a belief reinforcement situation to belief updating. The first and most common type (present in all cases) was *financial constraints* or *resource depletion*. These are extreme situations where entrepreneurs not only do not have the resources for their ventures but, sometimes, not even to support their own personal expenses. Joe (Sirius), for instance, commented: "*I didn't even have the means to buy coffee for my employee, it was a very delicate situation*." Likewise, Ben (Ursa) stated: "*Ursa went bankrupt in 2019, and as a result of that bankruptcy, the business model was changed*."

The second trigger was *team exhaustion*, characterized by intense physical and mental fatigue of the entrepreneurial team. Of course, this exhaustion had serious implications for the startups since, in many cases, the entrepreneur was the only one responsible for the startup's operations. Therefore, if the entrepreneur could not work, the startup would be stopped. We found evidence of this in four cases: Pleiades, Rigel 1, Sirius, and Ursa. Thiago (Rigel 1) described the difficult situation he went through:

> *This was a very sad time for me, I was very bad, even physically. I had a burst appendix, I had surgery, my wife left me, I was at rock bottom. I had no money; this was a very bad phase . . . in the end, I learned a lot of things, I matured as a human being.*

The third trigger corresponds to *third-party involvement*. Similar to retrospective and prospective sensemaking processes, we found that third parties were also crucial to encouraging behavioral change to finally update the OB. In two cases, these interventions occurred: Pleiades, in which the proposal of a number of companies seeking marketing information, in the end, partially induced a change in the mentality of entrepreneurs; and Sirius, in which a former angel investor and further co-founder, Milton, signalized Joe for changing the course of action as related by Joe: "*And then Milton came back and said: Joe, let's move this* [the platform] *to the companies. Then he asked me: how do you do it? I said: I didn't know. So, he told me to think about it.*"

Finally, in Ursa, we identified that the entrepreneurs also were partially persuaded to switch to a new approach by the appearance of a *new potential failure*. Specifically, it was the entry of a new player into the market, in the words of Ben: "*And also this* [large segment-leading startup] *was about to enter, and we knew it could, in fact, it was going to take us out of the market, so it was another big threat*."

After the occurrence of these triggers, entrepreneurs performed belief updating and finally pivoted. Table 12 provides additional evidence for the identified themes of moving from reinforcing to updating the beliefs.

Table 12 – Illustrative quotations for moving from reinforcing to updating the beliefs

Aggregate Dimensions	**Second-order Themes**	**First-order Themes**	**Examples from data**
Moving from reinforcing to updating beliefs	**Triggers for updating the beliefs**	Financial constraints/ resource depletion	"Ursa went bankrupt in 2019, and as a result of that bankruptcy, the business model was changed." Ben (Ursa) "Then the resources ran out; the money ran out, it was really hard . . . . There was a moment when we didn't generate income, all my reserves went to the company, I was the one who paid for a period of time, everybody's salary, the office rent, and it wasn't easy." Bia (Orion)
		Team exhaustion	"There were these events one after the other that left us very tired, physically exhausted, you know? . . . So for me, that was the moment when I said that it was no longer possible to work in this format; we had to change a lot of things. These crazy situations and losses made us really take the decision because we were in doubt." José (Pleiades)
		Third-party involvement	I believed in Joe; I have not only liked Sirius, but I liked him too, Joe, his story . . . So, in that period, where things were also very difficult in the public area because of the corruption scandals and everything else, . . . I knew that something had to be done. . . . So, the thought was, let's do

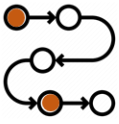
			something different; since we sell solutions, let's present an innovative tool that is not for education but within the context that we already had. Milton (Sirius)
		Another ex-ante failure	"And also this [large segment-leading startup] was about to enter, and we knew it could, in fact, it was going to take us out of the market, so it was another big threat." Ben (Ursa)

Source: created by the author.

6.5 PIVOTING APPROACHES

In addition to the process model, we discovered some patterns in the sequences of events followed by the entrepreneurs (as evidenced, for instance, in the multiplicity maps). Based on these patterns, we identified three different pivoting approaches: The break-point approach, the parallel approach, and the adaptative approach (see Table 13). We found that each approach entailed a series of specific implications and demands of effort and resources that, to some extent, made performing the pivots more or less challenging for the entrepreneur.

Table 13 – Pivoting approaches

Pivoting Approach	Description	Cases
Break-Point Approach 	This approach is characterized by pivot postponement and the stretching of resources. Moreover, the entrepreneurs reach a breakpoint or a situation that combines the depletion of financial resources and the exhaustion of the entrepreneurial team, which ultimately pushes them to update the belief and pivot.	**7:** Aquila, Orion, Pleiades, Rigel (1), Sirius, Ursa, Vega (1)
Parallel Approach 	In this approach, entrepreneurs generally engage in an actuating response to failure and quickly move to update the belief. However, they do not have certainty in relation to which alternative course of action to follow. Therefore, they decide to run two or more alternative courses of action in parallel to select the best performing and thus address the pivot.	**6:** Alpha, Andromeda, Carina, Centauri (2), Draco, Rigel (2)
Adaptative Approach 	In this approach, entrepreneurs quickly make a clear sense of the failure resulting in an actuating response, therefore, engaging in belief updating. Additionally, entrepreneurs are characterized by being strongly driven by external feedback, i.e., entrepreneurs constantly test and evaluate the performance of their course of action to guide their entrepreneurial decisions.	**26:** Antares (1,2), Beta (1,2,3), Betelgeuse, Canopus, Centauri (1), Columba, Fornax (1,2), Helio, North Star (1,2), Pegasus (1,2,3), Phoenix, Polaris (1,2,3,4), Pyxis (1,2), Vega (2,3)

Source: created by the author.

Break-point Approach

This approach is characterized by pivot postponement and the stretching of resources. In most cases within this approach (Orion, Pleiades, Rigel (1), Sirius, Ursa), the entrepreneurs had an initial inerting response towards failure and preferred to persist rather than pivot. In fact, it required a third party's intervention and identification of financial constraints in order to shift to belief updating. Likewise, the entrepreneurs reported evidence of fixation (e.g., "*it's as if you have found the love of your life and you are reluctant to let her go*," Joe, Sirius) and blindness (e.g., "*I didn't know what to do, I didn't know how to proceed,"* Martin, Vega) that difficult to make the decision to pivot. Additionally, all entrepreneurs attributed the failure to uncontrollable external causes (e.g., the entrance of a major player, Ursa) before belief updating, and two (Joe, Sirius; and José, Pleiades) accompanied by uncontrollable internal causes (e.g., "*we were very hardheaded*," Pleiades).

We refer to this approach as *Break-point* because, in essence, the entrepreneurs necessarily reach a breakpoint that ultimately pushes them to update their beliefs and pivot. The breakpoint consisted of a situation that combines the depletion of financial resources (e.g., "*the money has run out*," Sixto, Aquila) and the exhaustion of the entrepreneurial team (e.g., "*that left us very tired, physically exhausted*," José, Pleiades). Certainly, such a situation leads to conditions of stress and vulnerability for entrepreneurs and may compromise the very existence of the startup, and moreover, the entrepreneur's integrity. Joe (Sirius) described his situation as follows:

> *It feels like you have an iron ball tied to your foot, and you're stuck there, and you can't do anything else. You can't get out of there. I didn't have the key to the lock to open it and get out, even though I wanted to. A couple of times I tried to pull the iron ball and I couldn't because it's so heavy . . . because the weight is the height of debt, all the stuff I programmed, so all this weight was still holding me in: Try Joe, try to do something on the platform! . . . It's such a negative thing that it leads to burnout in entrepreneurs, which is something that happens to the point of leading to suicidal thoughts. It starts with depression, and I think that in these phases that precede the pivot, there is a stage of depression; yes, it's natural.*

In the most severe cases where depressive episodes occurred (Sirius, Vega 1, Rigel 1), the intervention of third parties (e.g., friends and family who became partners [Rigel 1 and Vega 1]) was necessary to stimulate the change in the entrepreneur's judgment that would eventually lead them to pivot. Further, in cases in which there was more than one founder (Aquila, Ursa, Orion, and Pleiades), it was necessary to mobilize the entire entrepreneurial team to thoroughly

evaluate the situation and establish a sort of *ultimatum* to take decisive and distinct actions that ended up in the pivot. The case of Aquila illustrates this ultimatum:

> *We sat down to have this discussion about: what do we do, close the company, not close it? . . . Then I said: We have no more money! We have money already invested, put on the table, but we are not generating revenue. We have to decide now (Sixto).*

Parallel Approach

In this approach, entrepreneurs generally engage in an actuating response to failure and quickly move to update the belief. However, they do not have certainty in relation to which alternative course of action to follow. Therefore, during the prospective sensemaking, the entrepreneurs decide to test two or more alternatives in parallel and select the one that provides the best results (e.g., Carina tested two BMs: logistics services and food delivery platform). In the *parallel approach*, all the entrepreneurs reconfigured their offering for it to serve two or more different purposes. For instance, in Rigel 2 and Draco, the platform was enabled to work for both SMEs and large corporations. Thiago (Rigel 2) explained: "*we split the company in two: we divided the company into SMEs, and left it running in parallel . . . together with the big corps.*"

For the selection of the new course of action, the entrepreneurs assessed which one offered the best performance (e.g., more scalability potential, more alignment with the team's interests, more sales) and chose the most favorable option. Centauri 2 provides evidence in this regard:

> *During 2013-2014 and some of 2015, we had four segments: we served insurers, we served car repair shops, we served individuals, and we served companies. But at that time, let's say we were very inexperienced and we were losing a lot of money . . . . So what we did was to sit down with the shareholders and analyze what made the most sense. . . . Then I found that, for example, insurance companies, which was an expanding segment at that time, had to comply with a series of legal proceedings . . . . So we conducted several market tests, and we generated several interesting things for the insurance sector. . . . Finally, we saw that the insurance companies have a lack of supply in some specific brands, and that is where we focused. The proposal was that we quickly brought them spare parts of some brands that they don't have here, and they* [spare parts] *aren't accessible to them* [the insurance companies]. *Then we create a specific solution for that.*

Finally, it is important to note that the parallel approach typically demands significant resources. On the one hand, entrepreneurs should invest resources for reconfiguring the offering to serve two or more purposes. On the other hand, in all the cases (Andromeda, Alpha, Carina, Centauri, Draco, and Rigel 2), the entrepreneurial team had to double its efforts to conduct the operation of the proposals and carry out trials in parallel. Therefore, and in line with prior studies (e.g., Chen et al., 2021), this approach is not one of the most popular among entrepreneurial ventures, which typically experiment sequentially rather than in parallel.

Adaptative Approach

In this approach, entrepreneurs quickly make a clear sense of the failure resulting in an actuating response, therefore, engaging in belief updating. Additionally, entrepreneurs are able to perform retrospective and prospective sensemaking relatively seamlessly. The entrepreneurs attributed this characteristic to the clarity they have about the final objective (or problem) they have in mind to address and what it means to be an entrepreneur. Danilo (Antares), for instance, mentioned that:

> *You have insights that you get from the market and a set of information that you often raise without science, not proven data, perceptions. It is loose information that you find and create a vision of the future. This work of creation and vision of the future, of pointing to where things are going, is what I think is the essence of entrepreneurship.*

The *adaptative approach* is also characterized by being strongly driven by external feedback, i.e., entrepreneurs constantly test and evaluate the performance of their course of action (e.g., Phoenix, Fornax, Polaris, Antares). As previous authors have appointed (e.g., Agrawal et al., 2021; Ries, 2017), we found that feedback and experiments provided to entrepreneurs signals that indicate that the startup is heading in the right direction, or on the contrary, if there are elements that need to be adjusted. Interestingly, although it may seem an obvious approach, experimentation requires meticulousness and criteria to define when and which experiments to conduct. Consider two cases from our sample that employed the adaptive approach: Phoenix and North Star (1,2). To test the validity of their original idea, the Phoenix team conducted a test using the Wizard of Oz method. Based on the feedback obtained, which validated the idea, the entrepreneurs decided to invest resources (even Bruna quit her job) and develop a full version of the product. However, after some time of good results (they reached 200,000 downloads of the application), they began to have many

technical complaints, and customers were no longer using the product. At that point, Bruna and her team decided to take a pause, reflect on the feedback they were receiving, and finally rebuild the product and pivot to meet the customer's demands. However, this pathway: validate, launch, fail, redo, and relaunch, may have implications beyond financial losses, as Bruna explains:

> *So it turned out to be a very frustrating situation. Because we were able to validate that it was possible to do something cool, there was a market, people were interested and willing to pay, but we couldn't deliver the solution because we launched a business that wasn't ready at that moment. . . . There were a lot of complaints that our product didn't work, so it got a very big reverse effect . . . it even hurt our reputation.*

From this point on, feedback becomes even more critical for Phoenix. Bruna expounds on the importance of this:

> *So we were basically driven by customer feedback. And that was the best way; they were the ones that guided us. Of course, we also did some other insights, but we were almost guided by them. . . . And regarding pivoting, I think that the experiments, the metrics, are fundamental to help your decision. . . . The entrepreneur will only be able to make the decision based on information, not based on opinions or illusions.*

The case of North Star illustrates a different path within the same adaptive approach. From the beginning, Tim guided his next steps based on feedback from the market. For example, to validate the original idea, he and his partner conducted nearly 200 interviews with physicians, physical therapists, and patients. Later, to determine the design of the photomedicine device, Tim notes that they always made prototypes; they came to have five generations of prototypes before consolidating the final design. Afterward, to validate the startup's revenue model, Tim conducted another series of tests in some pharmacies to determine the feasibility of selling the device in that channel, as Tim explains:

> *I got a cell phone box and made a mockup . . . . We made it quite pretty, and I put it on a gondola in a pharmacy and waited for people to get it. . . . And when people picked it up and went to the checkout, I started talking to them, asking them what they thought, why they were buying it and how much they thought it would cost, and surprisingly people said they expected to pay between $10, $20 . . . . So this quickly showed me that this plan to sell at the pharmacy . . . didn't make sense because it would need, at the very least, the component cost to be five times less. . . . it* [the test] *served to eliminate that route.*

Three Different Pivoting Approaches

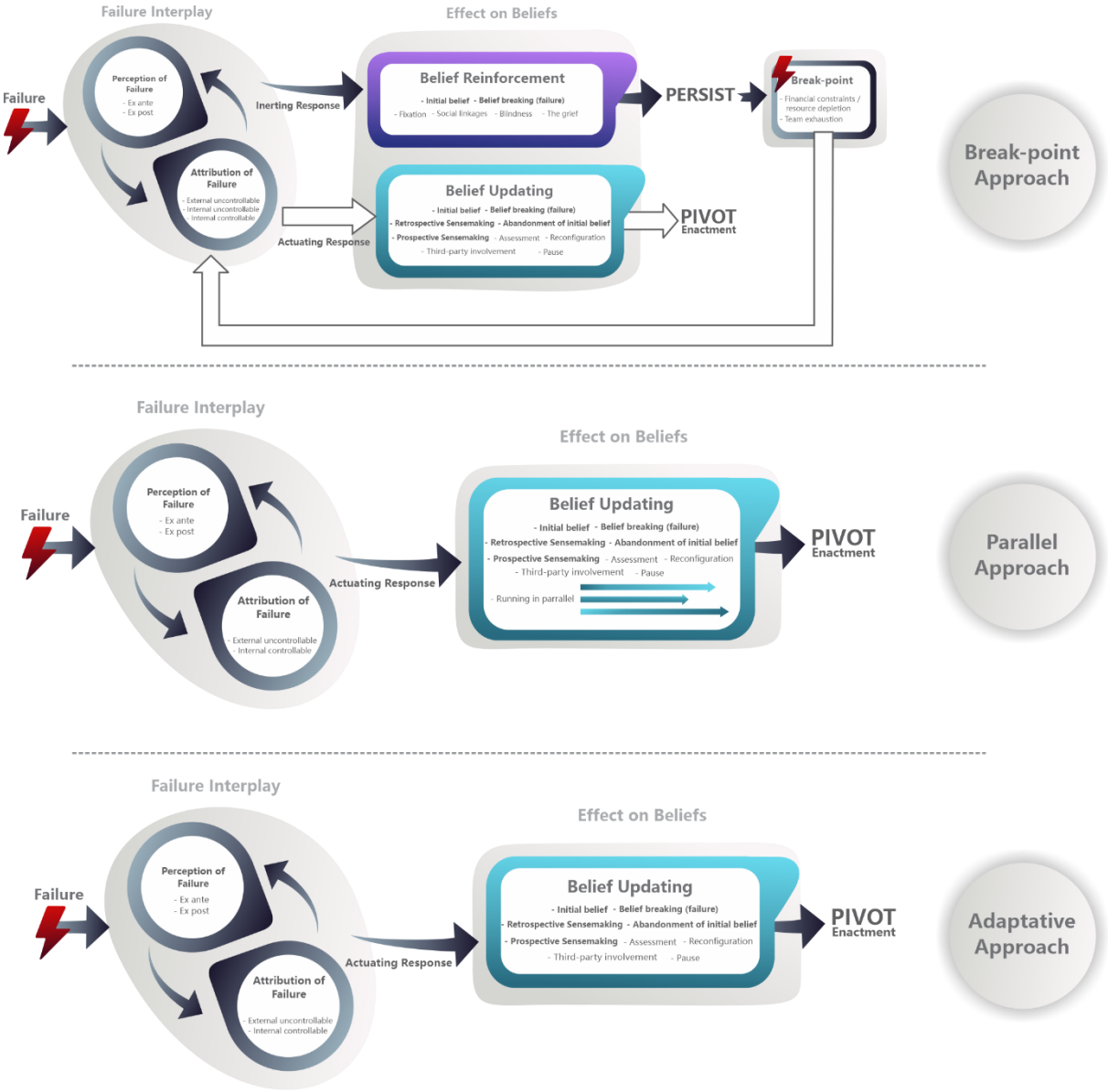
These three pivoting approaches shed light on how pivots differ. For instance, each approach involved different events and in different sequences, as can be seen in Figure 46. Additionally, we identified that some pre-existent beliefs might facilitate pivoting. More specifically, the notions that the venture or the offering are not fully resolved and that it should not generate unconditional attachment. We identified these beliefs in cases like Phoenix, Fornax, Helio, Canopus, and Polaris. Moreover, differently from cases such as Sirius and Orion, where the entrepreneurs demonstrated traits of psychological ownership and fixation (e.g., in referring to the venture as "baby" or "love of your life"), Martin (Vega) is emphatic in mentioning that he does not see "business as sons." He adds that he sees business models as projects that "have to work," and to do so, changes must be made. Similarly, Danilo (Antares) commented:

> *I think the fundamental issue with people not pivoting easily is because of attachment. I think this is a trap, people get attached to an idea, to a business model, and this attachment prevents them from seeing an opportunity or more better opportunities ahead. In our case, we have never been attached to the idea, so this made it easy to pivot*.

Not surprisingly, the cases in which entrepreneurs adopted an adaptive approach performed the pivots in a less costly way from a cognitive point of view (not leading to extreme situations such as grief or depression) and in terms of resource depletion (mainly financial).

Furthermore, our findings suggest significant differences regarding the amount of resources involved. Here, we refer not only to financial or technical resources but also (and particularly) to human resources embodied in the entrepreneurial team. This is critical because, as several scholars have pointed out (e.g., Dencker et al., 2009; Haynie et al., 2012; Liñán et al., 2016), entrepreneurs are often the only human resource a new venture has, and on them depends the entire business operation. Therefore, we could state that the break-point approach may be considered the most costly approach (i.e., involving more resources) and takes the longest time to decide to pivot.

Figure 46 – Three different pivoting approaches



Source: created by the author

Analyzing the differences between these approaches led us to examine further why, in some cases, it is difficult to pivot. The following section discusses five points that could hinder pivoting decisions.

Why Pivoting May be Difficult

The journey of this doctoral thesis has provided us with many inputs to understand the phenomenon of pivoting. A fundamental aspect that we have perceived is that this decision is

often difficult to make. This section proposes to briefly discuss five aspects that can shed light on why pivoting may be difficult.

(I) Personal attachment. Our findings point out that when entrepreneurs experience some personal attachment to their ventures (i.e., perceiving their ventures as their inner *raison d'être* or life proposes), they are more likely to persist in their course of action despite having failed. Joe (Sirius) provides plenty of evidence in this regard:

> *When you embrace that purpose as your life purpose, when that is your life purpose itself, it's a very cruel business. It consumes you, to the point of defining you, to the point that internally, it seems that you have that feeling of being even dead, because it's your business, you created it, you gave all your blood to it. . . . What made it more difficult to pivot, was that besides embracing my product, I embraced my vision for the public school.*

Conversely, in the case of Antares, even though the entrepreneur confirmed his personal motivation to produce palm heart related to the ties acquired from his father, Danilo, after a dedicated market exploration, foresees that it is a very predatory business and decides to pivot the venture. He describes this decision as an "easy one" and remarks that he has no significant passion for that initial idea.

(II) Lack of pre-existent beliefs enabling the pivot. In cases such as Phoenix, we identified that some pre-existent beliefs contributed to abandoning initial OB and adjusting it. More specifically, it is related to the internalization of the notion that an OB is essentially ill-defined and has several unclear aspects that will need adjustments to ultimately be scalable and sustainable. As McMullen (2015) pointed out: "Opportunity is not an oak tree born of an acorn of an idea. It is more like a stem cell that can grow into a host of body parts given the necessary environmental conditions." Therefore, the entrepreneurial focus is on finding a scalable and viable business proposal rather than focusing on an idea led by any particular passion.

(III) Uncertainty. As previous scholars have pointed out (e.g., McMullen & Shepherd, 2006), although inherent in entrepreneurial settings, uncertainty is challenging for entrepreneurs. First, uncertainty can lead to situations of procrastination and hesitancy, missed opportunities, and even deplete all resources (that may occur in cases where the decision to pivot is not made opportunely). Additionally, Anderson and Kellam (1992) argue that in the face of uncertain and ambiguous data, people's judgment may be biased and thus prevent the assimilation of new evidence, resulting in the persistence of prior beliefs.

(IV) The OB is linked to beliefs about the self. Similar to the personal attachment, we found that when the OB is closely bound up with the entrepreneur's own image, pivots are more

difficult to occur. Accordingly, Bendaña and Mandelbaum (2021, p. 81) state that "the beliefs that humans seem least likely to revise are in fact highly contingent (and often false) beliefs about the self: the belief that one is a good person, a smart person, a reliable, consistent person, and the like." We found, for example, that Joe (Sirius) conceived his venture as part of his identity, which in turn impacted his beliefs about his-self and the venture. Scholars indicate that this difficulty may be related to the fact that individuals' self-image beliefs (also known as core beliefs) are those that ultimately guide the whole beliefs' structure (Bendaña & Mandelbaum, 2021; Mandelbaum, 2019).

(V) Abandoning beliefs is effortful. As our belief updating model suggests, entrepreneurs should partially or completely abandon their initial OB for pivots to occur. However, as pointed out by Bendaña and Mandelbaum (2021, p. 85), rejecting prior beliefs "is a controlled, effortful, and breakdown-prone process." Thus, although necessary, abandoning previous beliefs during pivots is not easy and requires conscious processing. This process, for instance, requires realizing that the initial course of action was not entirely correct; thus, it also requires accepting that the initial judgment was not entirely reliable, a situation that can lead to conflicts with the beliefs about the self (Westgren & Holmes, 2021). In other words, this can undermine the self-confidence of the entrepreneurs' judgmental capacity (Khanin et al., 2021).

Our results progressively revealed important implications from the point of view of academia and practice. These considerations allowed us to build an alternative understanding of pivot decisions and, thus, advance our knowledge of this critical entrepreneurial phenomenon. Likewise, the conjunction of our results and some concepts derived from the tenets of entrepreneurial judgment theory, the cognitive science of belief, and failure and attribution theory, enabled us to elaborate a process model of pivoting in startups that contributes to shed light on how these important theoretical issues are integrated and interact with each other during entrepreneurial action. These observations will be discussed in the next chapter.

7 FINAL REMARKS: DISCUSSION, CONTRIBUTIONS, IMPLICATIONS, AND LIMITATIONS

We began this thesis seeking to understand how entrepreneurs pivot their startups. The analyses of our qualitative research enabled us to build a process model of pivoting in startups to open the judgment "black box" and better understand how the failure interplay and the effects of failure on entrepreneurs' beliefs lead to pivots. In doing so, we contribute to existing literature, which largely has been centered on the different triggers and types of pivots (Bajwa, Wang, Nguyen Duc, et al., 2017; Sala et al., 2022; Terho et al., 2015), and identifying the key factors that may interfere with pivoting decisions (Grimes, 2018; Hampel et al., 2020; Kirtley & O'Mahony, 2020). Instead, we focus on identifying the underlying judgmental logic of the process of pivoting: i.e., how failures, beliefs, and actions intertwine to lead to pivots.

This chapter is structured in four sections. First, in section 7.1, we discuss how the findings allowed us to narrow the identified gaps described in section 1.2. Section 7.2 discusses our theoretical contributions to the pivoting, judgment, and failure literature bodies. Then, section 7.3 discusses the implications for practice. And finally, section 7.4 presents some limitations and opportunities for further research.

7.1 NARROWING THE RESEARCH GAPS IN PIVOTING DECISIONS

As presented in section 1.2, we identified five major gaps that remain unclear. First, we noted that efforts to define pivoting and how it differs from other strategic decisions have been rather few. Second, although scholars have already informed about the influence of several cognitive aspects on pivot decisions, this information is somewhat scattered, which makes it difficult to identify which cognitive-affective attributes and biases are more prevalent in pivot decisions. Third, it is still unknown how the elements affecting the judgment during this decision (failures, beliefs, actions) intertwine to lead to pivots. Fourth, there is a lack of understanding of how failures relate to pivots and why some entrepreneurs decide to pivot, whilst others persist regardless of failures' emergence. Finally, it is not yet clear whether pivots occur differently and how they differ from each other. Based on our results, our research contributed to narrowing the gaps mentioned above.

First, we conducted two systematic literature reviews to establish an improved conceptualization of pivoting as described in section 3.1.3. We define pivoting (or pivot decision) as a strategic decision made after a failure (or the identification of a potential failure)

of one or more elements of the current business model (BM), which potentially threatens the startup's resource base. This decision changes the course of action, reconfigures the resource basis, and may modify the OB and one or more elements of the BM. A pivot, therefore, refers to the concrete action of change that redirects the course of the startup. Second, as described in section 3.2.4, we identified the cognitive-affective attributes and biases that may affect judgment during pivoting. We identified that cognitive adaptability/flexibility, counterfactual thinking, optimism, risk-taking propensity, self-regulation, exploratory style, self-efficacy, entrepreneurial passion, and openness are the cognitive-affective attributes most related to pivots. Further, we found fear of failure, locus of control, overconfidence, over-optimism, psychological ownership, solution/product blind adherence, persistence bias, risk aversion, inertia, confirmation biases, failure-driven biases, and self-serving attribution as the biases most related to pivots. Together these SLRs contributed to addressing the two first research gaps.

Third, based on the empirical research, we built a process model (see Chapter 6) that provides an alternative understanding of how entrepreneurs pivot their startups. By integrating different visual mapping strategies and coding analyses, we identified how the 26 core elements (first-order themes in Figure 24) that constitute the building blocks of our process model chain together and form the different pathways to pivot. The underlying building blocks that explain how entrepreneurs perform pivoting are failure interplay, effect on beliefs, and triggers for updating the belief in case of persistence. In Figure 41, we plot these building blocks to generate our process model and pinpoint how they interact with each other. By creating visual maps (Figures 27 – 38) and multiplicity maps (Figure 39), we could identify the sequence of these elements that culminated in the startup pivot. We contributed to addressing the third and fifth research gaps from these findings.

Fourth, we found out that the interplay between the perception of failure and attribution of failure plays a major role in determining whether the entrepreneurs will update their beliefs and pivot, or will reinforce their beliefs and persist. We identified that the failure interplay has two types of responses: *actuating* and *inerting responses*. Accordingly, these responses have an effect on the beliefs in which the actuating response will lead to *belief updating* (and finally to the pivot enactment) and inerting response to *belief reinforcement* (and finally to persist in the failed course of action). Nevertheless, in the five cases in which entrepreneurs first opt to persist (Orion, Pleiades, Sirius, Ursa, Rigel 1), we identified the mediation of four types of triggers that enabled the entrepreneurs to *move from reinforcement to belief updating*: third-party involvement, financial constraints, team exhaustion, and another ex-ante failure. Taken together, the building blocks of our process model offer promise for explaining how failures

relate to pivoting and why some entrepreneurs decide to pivot, whilst others opt to persist regardless of the emergence of failures, thus contributing to filling the fourth research gap.

Finally, we identified some patterns among the cases from which we set three different pivoting approaches: *break-point, parallel*, and *adaptative*. Our findings point out that each approach entailed different implications, efforts, and resources that, to some extent, made performing the pivots more or less challenging for the entrepreneur. By identifying the three pivoting approaches, we also determined how pivots vary, thus contributing to the fifth research gap.

In the sections that follow, we present our theoretical contributions.

7.2 THEORETICAL CONTRIBUTIONS

By narrowing the research gaps, we also contribute to several research lines such as the emerging field of pivoting in new ventures, decision and judgment in entrepreneurship. In the following we will detail our theoretical contributions to these bodies of study.

7.2.1 A Process Model for Pivoting in Startups

Our primary contribution is a process model for pivoting in startups (Figure 41). In doing so, we diverge from the predominant nascent pivot literature, which emphasizes studying when to pivot and its main types (Bajwa, Wang, Nguyen Duc, et al., 2017; Sala et al., 2022; Terho et al., 2015). Conversely, we join the emerging literature stream that addresses pivoting from a processual perspective (Comberg et al., 2014; Hampel et al., 2020; Kirtley & O'Mahony, 2020). Addressing the pivoting from a process perspective allows us to better understand how pivots actually occur. While process approaches have provided emerging insights regarding which factors influence pivots (Comberg et al., 2014) and how entrepreneurs manage and communicate pivots to their stakeholder networks (Hampel et al., 2020), our study identifies the critical events and relations that constitute the process of pivoting.

Our process model provides more accurate evidence about how failures trigger pivots, a latent consideration in several previous studies (Ghezzi & Cavallo, 2020; Ladd, 2016). Accordingly, our study found that the interplay between the perception of failure (i.e., how entrepreneurs are aware of failures) and attribution of failure (i.e., external uncontrollable, internal uncontrollable, and internal controllable) is fundamental for entrepreneurs to update

their beliefs and pivot, or reinforce their beliefs and persist. Moreover, our analyses also identified the events and relationships that constitute the processes of belief updating and reinforcement. These findings contribute to previous studies (such as Kirtley & O'Mahony, 2020) that proposed that pivots affect beliefs; however, they do not describe in what way.

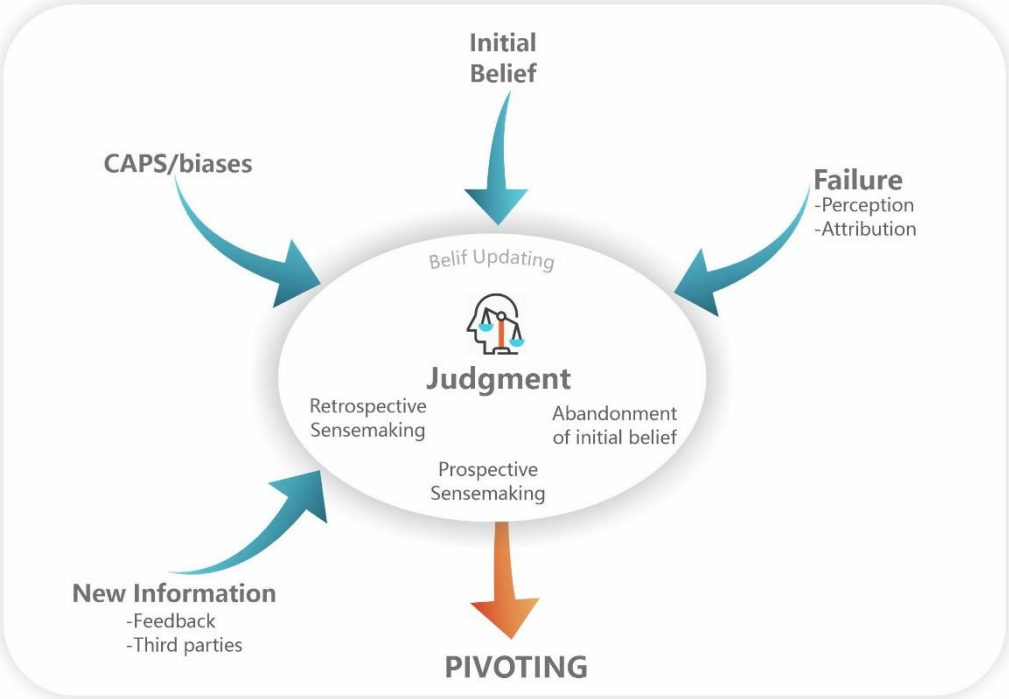
While several researchers (Chen et al., 2021; Comberg et al., 2014; Wood et al., 2019) have directly or indirectly indicated that pivots occur differently, this study advances the current scholarship by identifying empirically different pivoting approaches (i.e., break-point, parallel, and adaptative). The *break-point approach* is characterized by pivot postponement and the stretching of resources until reaching a breakpoint or a situation that combines the depletion of financial resources and the exhaustion of the entrepreneurial team. Such a situation ultimately pushes entrepreneurs to update their beliefs and pivot. In the *parallel approach*, entrepreneurs decide to run two or more alternative courses of action simultaneously and select the best performing to address the pivot. Finally, in the *adaptative approach*, entrepreneurs quickly make a clear sense of the failure resulting in an actuating response, therefore, engaging in belief updating. Our evidence suggests that the break-point approach is the most costly as it involves plenty of resources and takes the longest time to perform the pivot. Conversely, the adaptative approach can be considered the most efficient approach since the pivots are carried out more quickly and without emotional tolls—such as grief or exhaustion—and depletion of financial resources.

7.2.2 Pivoting in Startups: A Judgment Based Approach

Research on entrepreneurial decisions places judgment at the center of the decision-making process (e.g., McMullen and Shepherd, 2006; Packard et al., 2017). Scholars also suggest that under conditions of uncertainty, entrepreneurs exercise their judgment to establish value estimates regarding their beliefs in order to determine what course of action to pursue (McCann, 2017). In an attempt to further explain how judgments are formed, Foss et al. (2019) introduced the JBA and the BAR model. In this approach, entrepreneurs' beliefs (ideas, goals, preferences) guide the actions (allocate resources), generating some specific results. We draw on the BAR model and JBA to elaborate our conceptual framework (see section 3.4) because both provide elements such as placing the entrepreneur's judgment at the center of the entrepreneurial process and setting beliefs as antecedents of actions, which contribute to a better understanding of how entrepreneurial decisions are formed.

Although insightful, these approaches are not sufficient to fully explain how entrepreneurs make more complex decisions, such as pivots (McMullen, 2015). For instance, Lounsbury et al. (2019) claim that the BAR model falls short in explaining how cultural factors impact the entrepreneur's judgment. In order to contribute to this theoretical line, similarly to Griffin and Grote (2020), we explore the psychological literature that discusses the failure (which is tackled in section 7.7.3), the science of belief (e.g., Elster, 2009a; Porot & Mandelbaum, 2020), and cognitive aspects of decisions (e.g., Shoda & Smith, 2004; Zhang & Cueto, 2017). From this literature and our empirical research, we incorporated into our conceptual framework several elements. For instance, how the attitude toward beliefs (i.e., whether individuals update or reinforce their beliefs) (Bendaña & Mandelbaum, 2021), CAPS (Shoda & Smith, 2004), biases (e.g., Zhang & Cueto, 2017), and new information (e.g., third-party advice or market feedback) (e.g., Atanasov et al., 2020) interfere in the judgment process.

Figure 47 – Pivoting in startups: A Judgment Based Approach



Source: created by the author

As we discuss below, our findings revealed the core aspect of pivot decisions: belief updating. This aspect enabled us to open the "black box" of judgment and elaborate an understanding of pivoting in startups based on the judgment approach (see Figure 47).

Belief Updating: The Pivoting Enabler

The recognition of belief updating as the underlying judgmental process that enables pivoting decisions helps to unbundling how new information affects the judgment of entrepreneurs to overcome their "general tendency or bias toward staying the course" (Packard et al., 2017, p. 11). This finding contributes to scholars like Kirtley and O'Mahony (2020), who had already provided some evidence on the centrality of beliefs in pivot decisions, albeit without elaborating on how belief (and even more belief updating) enables pivot decisions. In line with Atanasov et al. (2020), we identified that for entrepreneurs to pivot, their initial beliefs need to be updated to be more consistent with the current environmental circumstances. Based on our evidence, we developed a belief updating process model (Figure 43) that contains ten elements through which entrepreneurs update their beliefs. Although these elements occurred in a variety of ways (see Figure 42), we identified five events that were present in all cases: initial belief, belief breaking, retrospective sensemaking, abandonment of past belief, and prospective sensemaking. Accordingly, we noticed that abandonment of past beliefs and retrospective and prospective sensemaking were critical for updating the beliefs.

On the one hand, abandonment of past beliefs is fundamental to cease to persist in the same course of action. However, as appointed by Bendaña and Mandelbaum (2021), rejecting prior beliefs is an effortful process, a situation that is worsened in the presence of biases such as escalation of commitment bias (Staw, 1981) or publicness and social pressures (Hollenbeck & Klein, 1987) (these issues will be further discussed in section 7.2.3). On the other hand, poor retrospective sensemaking can lead to the right solution to the wrong problem, virtually dismissing any action to improve the failure situation (in accordance with Gralla et al., 2016). Furthermore, without proper prospective sensemaking, the entrepreneur will tend to persist in the same course of action regardless of the fact that it has already been flawed. This may be in line with the continued influence effect described by Ecker et al. (2011). The underlying principle behind this effect is that people are reluctant to dismiss beliefs when no plausible alternative is provided to fill the void.

Moreover, we found out that in some cases (e.g., Fornax 1, Centauri 3, Orion, Phoenix), actions such as market assessments, reconfigurations, or parallel tests occurred before formulating new beliefs. This insight is particularly interesting for judgment discussion because we provide evidence that not always beliefs precede actions (as suggested in the BAR model, Foss et al., 2019). Our finding supports Marcus and Anderson (2010, p.

192), who argue that certain actions (e.g., educating key stakeholders) "are likely to influence entrepreneurs' beliefs about industry attractiveness, product or service superiority, and disruptive exogeneous change." Furthermore, our findings reveal that some other pre-existing beliefs facilitate the belief updating. For instance, entrepreneurs should be aware that the OB guiding the creation of their ventures is inherently imperfect and, as such, requires validations and adjustments to make it scalable and sustainable (as previously suggested by McMullen, 2015). In addition, entrepreneurs should believe that they must and (even more important) can do something to improve the failure situation (in line with Mueller & Shepherd, 2016).

According to Ganzin et al. (2020), literature offers a poor understanding of how prospective sensemaking occurs, particularly in contexts of uncertainty and ambiguity. In this regard, our analyses contributed to identifying that in order to form a new belief, entrepreneurs may resort to deductive or experimental reasoning (Boddington & Kavadias, 2021) or third-party interventions. Moreover, we argue that these three alternatives are neither mutually exclusive nor contradictory but rather complementary and intertwined during pivot decisions. Indeed, we found out that in the majority of our cases, entrepreneurs combined these alternatives (e.g., Andromeda, Antares, Draco). This finding supports Bae et al. (2021, p. 277), who argue that a good strategy to enable successful learning "is to give weight to past experiences, and to pay attention to feedback, before making an allocation decision on a current task."

Twenty cases of our sample adopted experimental reasoning (by engaging in tests such as Phoenix, North Start 1-2, or Antares 1-2, see Figure 42), more linked to the "by doing" depicted by Ott et al. (2017), to figure out the alternative belief that would indicate further improvement. From a universe of alternatives, the entrepreneurs selected those they believed had the greatest potential and submitted them to both technical and commercial assessment rounds. Some of the cases in our sample (e.g., Alpha, Andromeda, Centauri 2) assessed more than one alternative simultaneously by adopting a parallel approach. In another twelve cases (e.g., Canopus, Betelgeuse, Pyxis 1), the entrepreneurs pursue more deductive reasoning (Boddington & Kavadias, 2021) associated with the "by thinking" logic set by Ott et al. (2017). In other words, starting from a holistic understanding and based on their previous experiences, the entrepreneurs determined what was the best alternative for the startup and decided to pivot in that direction.

Additionally, we found out that in other cases (e.g., Rigel 2, Alpha, Sirius), it was required the intervention of a third party to stimulate the prospective sensemaking. However,

we suggest that in order for entrepreneurs to consider the third party's proposals, there must be minimum credibility of the source. This credibility is related to how trusted the source (the third party) is perceived by the entrepreneur. After conducted a series of experiments Pilditch et al. (2020) found out that information from sources considered to be highly trusted was taken up and eventually resulted in the updating of the belief. On the contrary, information from sources considered to be unreliable was considered fallacious and did not lead to belief updating.

Likewise, we found ten cases in which the involvement of a third party culminated with the updating of the belief. Among the type of third parties were clients or potential clients (Alpha, Rigel 1, Pyxis 2, and Pegasus 1), accelerators (Beta 1 and 2, and Helio), and angel investors (Columba, Sirius, and Vega 1). In all these cases, the entrepreneurs considered the sources highly trusted. Furthermore, in the majority of cases, the intervention of the third parties—which in some cases explicitly indicated a new course of action and in others merely suggested not to desist and encouraged the entrepreneur to seek another direction—led to pivots. However, traits of fixation and other biases may hinder pivoting. For instance, in the case of Beta 1, the entrepreneurs initially were reluctant to take up the suggestion of the accelerator to pivot some elements of the value proposition associated with the brand and design. Although the entrepreneurs considered the source (the accelerator) to be extremely reliable, what caused this reluctance was a fixation on its brand and design, as they considered it to be widely recognized by their customers. To settle this situation, the entrepreneurs were encouraged to conduct tests with the audience and with experts, and finally, the entrepreneurs made the pivot.

Conversely, we observed that in Orion's case, even though a third party (a consultant from a prestigious American university) strongly suggested to Bia to look for alternative courses of action, Bia did not take up the suggestion. Further, Bia not only did not take that suggestion but took it as a "provocation," as "a personal challenge," and resolved to prove the consultant wrong. We found that Bia experienced fixation traits, social linkages, and blindness. Moreover, the entrepreneur repeatedly emphasized that the consultant was rude, and she felt that the consultant did not understand her value proposition or her target market well enough. Orion's entrepreneurs decided to persist in their course of action until they reached a breaking point. These findings are consistent with Pilditch et al. (2020) and indicate that when entrepreneurs do not consider the source (or third party) that is suggesting the pivot as reliable (because it is not familiar with the domain), the suggestion is not taken into account. Therefore, it is more likely that the entrepreneur might prefer to persist.

7.2.3 Failure Interplay in Pivoting Decisions

Our main contribution to entrepreneurial failure literature is to provide evidence on how the failure influences pivot decisions, a missing relationship in current scholarship. Previous literature (Chen et al., 2021; Ghezzi, 2019) had highlighted the relationship between pivoting and the new venture's learning process. However, the literature has not explored how failures can be enablers of learning and lead to pivots. Specifically, our study identifies that the failure interplay—i.e., perception and attribution of failure—affects the process of forming estimates to judge whether to pivot or persist. Moreover, we integrated two bodies of literature—i.e., failure perception (Mueller & Shepherd, 2016) and attribution of failure (Graham, 1991)—that, although related, are not usually addressed together in the entrepreneurship literature or organizational research in general (Harvey et al., 2014). In line with Dweck (2015) and Weiner (1972), we found that in cases where the entrepreneur attributes the failure to uncontrollable external causes (e.g., context), the immediate response tended to be persistence in the failed course of action. Indeed, we found that in all cases where the break-point approach was adopted, the entrepreneurs attributed the failure (partially and totally) to external and internal uncontrollable causes. This finding is consistent with Staw (1981, p. 580), who argued that "when information pointed to an exogenous rather than endogenous cause of a setback," individuals are more prone to fall into the escalation of commitment and invest more resources in a failing line of behavior.

Alternatively, when entrepreneurs attributed the failure to controllable internal causes (e.g., poor strategy execution), the response tended to be a search for means to remedy the situation (in line with Weiner,1972 and Dweck, 2015). We observed that in the majority of the pivot cases (35 cases), the entrepreneurs attributed the failure entirely and partially to internal controllable causes. This finding may be related to the entrepreneur's perception of agency (Harvey et al., 2014) or maneuverability to improve his or her situation. According to Weiner (1972), when the cause focus is placed on the process and effort, individuals consider that the failure situation is plausible to be controlled. For instance, in the Centauri case, both co-founders indicated that the failure was attributed to internal controllable aspects. Whereas Mario pointed out that what led them to be in a critical situation was their "lack of focus" and that "they did not listen well to their customers," Bob claimed that he "rather believe[s] that our execution was not correct." Then, the startup founders decided to assess their BM by skimming which elements of their model were working and which did not, focusing on what really brought value to stakeholders.

Failure's attribution fundamentally contributed to defining whether an entrepreneur will have an actuating or inerting response. Although our evidence falls short in fully explaining the reasons for these response choices, we identified three alternative explanations: 1) entrepreneurs find it difficult to judge whether a failure situation is temporary or permanent. In line with Shepherd and Williams (2020), we found out that entrepreneurs may encounter difficulties in determining whether a given failure is due to a temporary unfortunate event or a permanent or quasi-permanent state of continued difficulty. For instance, in Rigel 1, the entrepreneur wondered if customers would soon allow technicians into their homes.

2) Entrepreneurs find it difficult to judge whether an opportunity belief has become obsolete. In accordance with Martignoni and Keil (2021), we found that some entrepreneurs in our sample could not know whether their beliefs had become obsolete and needed to be updated. Moreover, as in Orion's case, we found that this could only be known retrospectively.

3) Another alternative explanation is that due to the effect of 'intermittent rewards' (Staw & Ross, 1987), entrepreneurs may think they are on the right track when they are not. The effect of intermittent rewards refers to situations in which people receive some rewards related to a particular activity and causes people to become quite persistent. Moreover, as shown in slot machines, people continue to persevere in their failed line of behavior even when there is a decline in such rewards. We observed this in Orion's case. The entrepreneurs reported some "small victories" (e.g., pro bono projects, trials, and consultancy services), which were read as a sign that the startup was on the right track. However, over time (about a year), the resource constraints led the entrepreneurs to undertake a detailed assessment of the BM and finally pivot. Finally, we also found that four situations (i.e., financial constraints, team exhaustion, third-party involvement, and the emergence of another ex-ante failure) were necessary for entrepreneurs to shift their initial inerting response to an actuating one (12 cases in total, see Table 9).

Second, we identified four events (strongly associated with CAPS and biases) that contributed to the belief reinforcement that eventually led to persistence: fixation, blindness, social linkages, and the grief. Regarding fixation, we found traits of confirmatory bias (e.g., Beta 2 and Pleiades), which is the tendency to consider information that supports existing beliefs whilst rejecting evidence that disconfirms them (Mandelbaum, 2014). Literature provides some mechanisms that could attenuate such bias. These include a 'process debriefing' in which the individuals receive a detailed and personalized debriefing about the biased situation and are encouraged to express their points of view about it (Jelalian & Miller, 1984). Another mechanism is to challenge the formative evidence by raising alternative explanations

about a situation. Specifically, the individuals should be encouraged to consider different explanations and counterexplanations regarding a particular situation and beliefs (Anderson, 1982; Jelalian & Miller, 1984).

Similarly, we found some evidence linked to the escalation of commitment bias (e.g., Sirius). This bias refers to "instances in which individuals can become locked into a costly course of action" (Staw, 1981, p. 577). Furthermore, we found out that this biased behavior was exacerbated when entrepreneurs felt more personally and sentimentally attached to the business (as was also the case for Joe, Sirius). This finding is consistent with Staw (1981, p. 579), who argues that escalation of commitment "is most likely to occur when individuals feel personally responsible for negative consequences, and when these consequences are difficult to undo." Additionally, we propose that fixation situations may be explained from two perspectives: expectancy theory and self-justifying behavior. In a nutshell, according to the expectancy theory, decision-makers create a subjective expected utility in which they deem they will achieve the goal, and the return will be higher than the value of the investments (Tversky & Kahneman, 1981). As such, in cases of fixation, entrepreneurs may be deceived into thinking that the expected utility remains sufficiently higher than the value of the investment. In the second perspective, self-justifying behavior, entrepreneurs may get stuck in that fixation because they are unwilling to admit to others and themselves that their investments were in vain (Brockner, 1992).

This last consideration is also related to social linkages. In our analyses, we stated that social linkages could also prevent startups from pivoting, a situation that is linked to publicness and social pressures (Hollenbeck & Klein, 1987). On the one hand, publicness creates an overestimation of the value of such social ties, which brings psychological implications; for instance, entrepreneurs may tend to develop more commitment toward a specific course of action. On the other hand, when a startup reaches some relative popularity and recognition (e.g., in Pleaides or Rigel 1 cases), it generates social pressures, making it even more unlikely that the entrepreneurs would change their course of action. Moreover, verbalizing goals to others brings important effects on behavior (Wood et al., 2021). It could prevent entrepreneurs from relinquishing failed beliefs, among other reasons, because they do not want to expose their mistakes to others and appear to be incompetent or inconsistent (Staw & Ross, 1987; Wood et al., 2021). After all, as Hollenbeck and Klein (1987, p. 214) stated, "it is easy to abandon a goal known only to oneself."

In the following, we will detail the implications of this thesis for practice.

7.3 IMPLICATIONS FOR PRACTICE

In this section, we present some practical implications for early-stage entrepreneurs and their stakeholders interested in unraveling the intricate process of pivoting. In this sense, we point out that pivots may demand significant resources from the venture and even compromise the well-being of the entrepreneurial team. Therefore, one of the interests of this research is genuinely to contribute to entrepreneurs, mentors, teachers, and other stakeholders to better understand the implications of pivoting and make a better judgment in the face of such a transcendental decision. Following, we enumerate different points that we want to emphasize and bring to the attention of entrepreneuring practitioners.

First, we would like to draw attention to persistence in entrepreneurship. Persistence is linked with several top entrepreneurs of all time like Thomas Edison, Richard James, Steve Jobs, Richard Branson, or Elon Musk. The myth surrounding these entrepreneurs and other people who persisted in their endeavors despite adversity —fueled by phrases like "weathering the storm," "quitters never win and winners never quit"—creates a strong collective worldview in which persistence is considered an act of great value (Staw & Ross, 1987). However, on the other side of the spectrum, there are several brilliant entrepreneurs that opted to pivot their ventures and were well-succeeded as well (we can see the cases of YouTube, Twitter, PayPal, Groupon, Airbnb, Flickr, Pinterest, Instagram, Slack, Netflix, etc.). Therefore, our first consideration is concerning demystifying persistence as an exceptional value of entrepreneurship. As we mentioned earlier, Similar to a scientific theory, entrepreneurial opportunity beliefs need to be validated. Because entrepreneurial opportunities are essentially ill-defined venture envisions, very often, most of the elements that constitute an OB are not already resolved and will require several adjustments. As such, failures in the current course of action may be the prelude to a pivot.

Second, although the famous cases in which the entrepreneurs pivoted their ventures led to the "new" popular rhetoric of "fail fast, pivot quickly," we argue that it is something that should be taken with a grain of salt. As our findings suggest, in some cases, a pivot is not a decision that can be made quickly. On the contrary, validation based on systematic learning is crucial to determine whether and when to pivot (Virk, 2020). Indeed, in line with Morais-Storz et al. (2020), OB and BM elements should be revisited continually, not only after failure. Our 'adaptative approach' provides evidence in this regard. Startups that employed this approach constantly reviewed their performance and evaluated their BM to obtain feedback. In this way,

they identified failures or potential failures that could constrain the potential gains, adjusted the unsatisfactory BM elements, and consequently obtained better results.

There are also cases in which “fail fast” and “pivot quickly” are not feasible due to a variety of reasons such as inaccessibility to customers for testing, research costs, difficulties in reconfiguring the product, or difficulties in reducing uncertainties. In many cases, pivoting can be effortful because updating beliefs can also be effortful (Bendaña & Mandelbaum, 2021; Ecker et al., 2011). Our findings indicate that belief updating requests (1) the entrepreneur to make sense of the failure (implying in some cases the acknowledgment that mistakes were made), (2) abandoning initial beliefs, and (3) forming new ones. Therefore, entrepreneurs might employ a parsimonious approach for pivoting in which each aspect of the BM is carefully evaluated, and accordingly, starting by abandoning and adjusting the elements that appear to be most inconsistent.

Third, another key aspect to take into consideration is the need to have reliable information and performance monitoring. As prior literature has indicated (Antunes et al., 2021; Rompho, 2018), gathering external information (such as feedback, knowing new entrants, and regulatory changes) and assessing the startup’s performance have a positive impact on the venture performance. In this respect, Staw and Ross (1987) call attention to a factor that is not always considered when defining performance indicators. The point is to raise some indicators that allow the entrepreneurial team to see the costs of persisting when the current course of action has proven to be flawed. The authors also call attention to the importance of improving the quality of analysis and decision-making when failure is present. From indicators such as these, entrepreneurs will be able to observe and analyze the costs of persisting or pivoting to support this critical decision.

Moreover, according to the decision dilemma theory, having a clear definition of what ‘negative feedback’ is, becomes crucial to realize when investing in a given course of action is no longer prudent (Bowen, 1987), and thus to avoid a situation of escalation of commitment or overoptimism bias. In entrepreneurship, Sarasvathy and colleagues (e.g., Dew, Sarasvathy, et al., 2009; Sarasvathy, 2001) set out that several entrepreneurs employ the ‘affordable loss’ to determine the amount of resources they can afford and are willing to lose to build their ventures. This approach may be adapted as an indicator of negative feedback. However, in practice, this is not very easy to observe since, in many cases, entrepreneurs do not necessarily make a clear estimate of how much they would be willing to lose in their venture. Instead, they start investing their resources until they eventually perceive that they have already run out. We observed this in several cases within the ‘break-point approach’ (e.g., Aquila, Orion, Sirius), which is not in

vain, the most costly pivoting approach in terms of overall resource loss. Therefore, we stress the importance of defining indicators that help determine when to "pull the plug" on a certain course of action and thus be able to pivot.

Fourth, one crucial thing for entrepreneurs to realize in these circumstances is that they may be biased. Moreover, entrepreneurs must be especially wary of fixation tendencies and take counteracting measures to rebalance decision-making. For instance, entrepreneurs must be open to the advice of third parties who can analyze the situation without feeling directly responsible for the fate of the venture and, at the same time, make their points objectively and backed by evidence. This openness often implies deliberately seeking the opinions of outsiders who are not necessarily part of the entrepreneur's human capital network. Mentoring with experienced entrepreneurs or specialists can play an important role in providing an alternative reading of, for example, ambiguous information that does not allow the entrepreneur to perceive the failure. It may even involve psychological care due to the high load of stress and sentimental involvement that entrepreneurs sometimes have with their startups.

Another counterfactual strategy is to look at the startup from an outsider's perspective, which means analyzing the startup as if it belonged to someone else (Staw & Ross, 1987). Ask some Socratic questions such as: Is the startup doing as well as it could? If you pivot the venture, what will be the consequences for you, your team, and the rest of the stakeholders? How will persevering in a failed course of action affect your mental and financial health? Furthermore, drawing on Staw and Ross (1987, p. 9), entrepreneurs could ask themselves the following questions to clarify whether they are overcommitted to their ventures: Do I have a clear definition of failure? Do I have difficulties defining what would constitute a failure in my OB? Would a failure in my OB radically change the way I think of myself as an entrepreneur or as a person? Do I have difficulties hearing third parties' concerns about my startup? Do I feel that there will be no tomorrow if this venture ends?

Fifth, listening to different points of view may be fundamental to overcome situations of blindness or grief. In the two cases in which grief was manifest (Sirius and Vega), the involvement of third parties was crucial for entrepreneurs to overcome that situation. Similarly, in the cases where the entrepreneurs reported being "blind" and unable to know where to go (e.g., Pleiades or Orion), third-party involvement was critical. Furthermore, psychology research points out that the repetition of information can greatly impact the updating of beliefs by facilitating the abandonment of beliefs that have proven to be wrong and the encoding of new ones (Ecker et al., 2011). Thus, exposure to third-party advice can facilitate the belief updating process (for example, in Beta 1 and Helio cases). After all, as Agrawal et al. (2021)

point out, learning from mentors may contribute to the new venture's success. In addition, communicating the concerns to the key partners and supporting networks are crucial for entrepreneurs to capture alternative insights to enrich their decisions. In fact, Joe (Sirius) expressed that the period of grief and hopelessness would have been significantly shorter if he had had the chance to meet mentors or people who could help him to see other alternatives.

Finally, in line with Virk (2020), we argue that a pivot is not a goal in itself, nor is it something to be avoided. Moreover, given the uncertainties surrounding startups and their BMs, pivots are very likely to occur; there is plenty of evidence of this in practice and scholarship. Yet, scholars such as Boddington and Kavadias (2021) point out that in several cases in which startups ceased to exist, there was one thing in common: the entrepreneurs "did not pivot at all, or they pivoted very rarely" (p. 17). Accordingly, we consider that knowing and understanding the difficulties surrounding pivots, their mechanisms, and approaches is extremely useful for entrepreneurs to better manage their pivots and thus continue their entrepreneurial journey.

7.4 LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

This research certainly has a number of limitations that could be the basis for future studies. For instance, this study focused on the attribution dimensions "locus" and "controllability," leaving aside the dimension of "stability" (Graham, 1991), which may be an opportunity for future studies. By integrating the stability dimension, the understanding of how entrepreneurs interpret failures and their causes might be enriched. Moreover, a further research arena could explore deeper how emotions influence the failure attribution and dimensions (Weiner, 1986). Likewise, it could analyze how factors such as negative emotions (Shepherd & Cardon, 2009) may impact pivot decisions and thus augment knowledge about the break-point pivoting approach. Considering Martignoni and Keil's (2021, p. 1058) statement: "history is replete with examples of organizations that failed because they stuck to their old beliefs for too long," future studies can also examine the consequences of extreme cases in which entrepreneurs reach a break-point, but the decision to pivot is not made.

Additionally, there are limitations in terms of generalizability as the results were based on case studies from a limited sample of 39 pivot cases that occurred within 24 startups mainly located in Latin America. Therefore, differences in the findings may arise when compared to other contexts, such as the United States, where failure is more accepted (Burchell & Hughes, 2006). Thus, international studies comparing pivots in different spatial settings may provide an even clearer picture of how and why entrepreneurs do pivots. Likewise, it is of utmost

importance to develop further research in which pivot, persistence, and exit cases can be compared. Considering that this approach is likely to involve a larger number of cases (beyond the 39 cases studied in the present research), future studies will also require other methodological approaches such as QCA and quantitative methods. However, we deem that processual approaches offer a broad and rich terrain for further exploration of entrepreneurial decisions and, in particular, pivot decisions.

There are several questions regarding pivot decisions that remain open. For instance: what pre-existing concepts and beliefs (Yu, 2012) may affect pivot decisions? Under what circumstances are entrepreneurs more willing to accept suggestions made by third parties? How do entrepreneurs make sense of new information that subsidizes the decision to pivot? How does the type of failure (e.g., market mismatch, team underperformance) influence pivot decisions? How can lines of inquiry such as "magical thinking" and "spirituality" (Ganzin et al., 2020) broaden the understanding of pivots? How might other theories, such as complexity theory—which recognizes that dynamic systems never really reach a point of equilibrium (Fisher, 2020)—provide an alternative perspective to pivots (see "fluid state" in Flechas and Gomes, 2021)?

Finally, in line with Burchell and Hughes (2006), we endorse the recommendation to encourage policies and efforts not only to promote the creation of new ventures but also to promote agendas that contribute to the success of existing ventures and prevent them from being part of the 80% that perish in their first few years. Content on how to address failures, what a pivot is, and how to perform pivots should certainly be part of such agendas.

8 CONCLUSION

This thesis highlights the importance of pivoting in startups. Our findings demonstrate that such a decision demands resources and judgmental processes that sometimes exceed the cognitive capacities of the entrepreneurs. Likewise, we identify that this decision is a multiplicity process that occurs in multiple ways and involves multiple events. Our research emphasizes that the failure interplay plays a fundamental role in pivoting. The perception and attribution of failure affect how the entrepreneur responds to failure (i.e., whether it is inerting or actuating) and, consequently, whether it will promote the updating of the belief and pivot, or the reinforcement of the belief and persist. Moreover, we identified three pivoting approaches that explain how pivoting decisions vary and their unique characteristics: break-point, parallel, and adaptative approaches.

We hope that this study can contribute to increasing awareness about how challenging and resource-consuming the pivot decisions can be. Moreover, we expect this study can serve as a supplement for entrepreneurs, mentors, teachers, and others involved to better guide pivot decisions. We emphasize that, similar to a scientific theory, the OB needs to be validated. The point is not to discard everything and start from scratch; the point is to have and refine the ability to discern between the aspects of the OB that are working and those that are not (more similar to a composting pile described by O'Connor and Klebahn, 2011). Finally, we argue that our results also offer opportunities for further research that might better explain how entrepreneurs develop their new ventures and define their business models. We call upon the academic and practitioner entrepreneurial community to deepen the research on failure and the cognitive aspects that can hinder as well as facilitate its recovery.

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APPENDIX A – LIST OF DOCUMENTS INCLUDED IN THE REVIEW

Authors	Year	Title	Journal
Arend	2020	The roles of thought and affect on entrepreneurship – A new hope	Journal of Business Venturing Insights
Atanasov et al.	2020	Small steps to accuracy: Incremental belief updaters are better forecasters	Organizational Behavior and Human Decision Processes
Aversa et al.	2020	Customer complementarity in the digital space: Exploring Amazon's business model diversification	Long Range Planning
Axelson & Bjurstrom	2019	The Role of Timing in the Business Model Evolution of Spinoffs The Case of C3 Technologies	Research Technology Management
Bahrami & Evans	2011	Super-flexibility for real-time adaptation: Perspectives from Silicon Valley	California Management Review
Bajwa et al.	2017	"Failures" to be celebrated: an analysis of major pivots of software startups	Empirical Software Engineering
Bajwa et al.	2017	Start-ups Must Be Ready To Pivot	IEEE Software
Balocco et al.	2019	Lean business models change process in digital entrepreneurship	Business Process Management Journal
Bandera & Passerini	2020	Personality traits and the digital entrepreneur: Much of the same thing or a new breed?	Journal of the International Council for Small Business
Bhawe et al.	2016	Horse and cart: The role of resource acquisition order in new ventures	Journal of Business Venturing Insights
Bocken et al.	2016	Business Model Experimentation for Sustainability	Smart Innovation, Systems and Technologies
Bohn & Kundisch	2020	What Are We Talking About When We Talk About Technology Pivots? – A Delphi Study	Information and Management
Brandenburg et al.	2016	Toward an Adapted Business Modeling Method to Improve Entrepreneurial Skills Among Art Students	Artivate
Brenk et al.	2019	Learning from failures in business model innovation: solving decision-making logic conflicts through intrapreneurial effectuation	Journal of Business Economics
Buccieri et al.	2020	International new venture performance: Role of international entrepreneurial culture, ambidextrous innovation, and dynamic marketing capabilities	International Business Review
Burton	2020	Start-up success: the story of POINT 3 Basketball CEO Michael Luscher and the future of entrepreneurship	Sport in Society
Camuffo et al.	2020	A Scientific Approach to Entrepreneurial Decision Making: Evidence from a Randomized Control Trial	Management Science
Carroll & Casselman	2019	The Lean Discovery Process: the case of raiserve	Journal of Small Business and Enterprise Development
Cohen et al.	2019	The Role of Accelerator Designs in Mitigating Bounded Rationality in New Ventures	Administrative Science Quarterly

Conway & Hemphill	2019	Growth hacking as an approach to producing growth amongst UK technology start-ups: an evaluation	Journal of Research in Marketing and Entrepreneurship
Crick & Crick	2018	Angel investors' predictive and control funding criteria: The importance of evolving business models	Journal of Research in Marketing and Entrepreneurship
Crilly, N	2018	'Fixation' and 'the pivot': Balancing persistence with flexibility in design and entrepreneurship	International Journal of Design Creativity and Innovation
De Cock et al.	2019	Making the Lean Start-Up Method Work: The Role of Prior Market Knowledge	Journal of Small Business Management
Domurath et al.	2019	Does negative feedback impact new ventures' organizational identity? The role of founding teams' human capital and feedback source	Journal of Business Venturing
Dopfer et al.	2017	Adapt and strive: How ventures under resource constraints create value through business model adaptations	Creativity and Innovation Management
Earle et al.	2019	Strategy-as-Process in a Technology Venture: A Case Study of Pivots, Pauses, Partners, and Progress	Technology Innovation Management Review
Eesley & Wu	2020	For startups, adaptability and mentor network diversity can be pivotal: Evidence from a randomized experiment on a mooc platform	MIS Quarterly: Management Information Systems
Felin et al.	2019	Lean startup and the business model: Experimentation revisited	Long Range Planning
Frederiksen & Brem	2017	How do entrepreneurs think they create value? A scientific reflection of Eric Ries' Lean Startup approach	International Entrepreneurship and Management Journal
Ganguly & Euchner	2018	Conducting Business Experiments Validating New Business Models Well-designed business experiments can help validate assumptions and reduce risk associated with new business models.	Research Technology Management
Gans et al.	2019	Foundations of entrepreneurial strategy	Strategic Management Journal
Garcia-Gutierrez & Martinez-Borreguero	2016	The Innovation Pivot Framework Fostering Business Model Innovation in Startups	Research Technology Management
Ghezzi	2020	How Entrepreneurs make sense of Lean Startup Approaches: Business Models as cognitive lenses to generate fast and frugal Heuristics	Technological Forecasting and Social Change
Ghezzi & Cavallo	2019	Agile Business Model Innovation in Digital Entrepreneurship: Lean Startup Approaches	Journal of Business Research
Ghezzi, A	2020	Digital startups and the adoption and implementation of Lean Startup Approaches: Effectuation, Bricolage and Opportunity Creation in practice	Technological Forecasting And Social Change
Giones et al.	2020	Revising entrepreneurial action in response to exogenous shocks: Considering the COVID-19 pandemic	Journal of Business Venturing Insights
Goswami et al.	2018	Accelerator expertise: Understanding the intermediary role of accelerators in	Strategic Entrepreneurship Journal

		the development of the Bangalore entrepreneurial ecosystem	
Griffey, J	2014	Daily Blogging for a Year: A “Lean” Pathway to Launching a Web-Based Business	Artivate
Grimes, MG	2018	THE PIVOT: HOW FOUNDERS RESPOND TO FEEDBACK THROUGH IDEA AND IDENTITY WORK	Academy of Management Journal
Guinan et al.	2019	Creating an innovative digital project team: Levers to enable digital transformation	Business Horizons
Guler, I	2018	Pulling the Plug: The Capability to Terminate Unsuccessful Projects and Firm Performance	SSRN Electronic Journal
Hampel et al.	2019	The Art of the Pivot: How New Ventures Manage Identification Relationships with Stakeholders as They Change Direction	Academy of Management Journal
Kirtley & O'Mahony	2020	What is a pivot? Explaining when and how entrepreneurial firms decide to make strategic change and pivot	Strategic Management Journal
Kiura et al.	2014	Creating a New Business Through Applying the Systems-Based Evolutionary Learning Laboratory Approach	Systems Research And Behavioral Science
Ladd, T	2016	Customer Development and Effectuation: A Review of Textbooks to Teach a Contemporary Introduction to Entrepreneurship	Management Teaching Review
Leatherbee & Katila	2020	The Lean Startup Method: Early-Stage Teams And Hypothesis-Based Probing Of Business Ideas	Strategic Entrepreneurship Journal
Liu & Bell	2019	Exploration of the initiation and process of business model innovation of successful Chinese ICT enterprises	Journal of Entrepreneurship in Emerging Economies
Manolova et al.	2020	Pivoting to stay the course: How women entrepreneurs take advantage of opportunities created by the COVID-19 pandemic	International Small Business Journal: Researching Entrepreneurship
Mansoori & Lackéus	2019	Comparing effectuation to discovery-driven planning, prescriptive entrepreneurship, business planning, lean startup, and design thinking	Small Business Economics
Mäntylä et al.	2017	Guest editorial for special section on success and failure in software engineering	Empirical Software Engineering
Marx & Hsu	2015	Strategic switchbacks: Dynamic commercialization strategies for technology entrepreneurs	Research Policy
McDonald & Eisenhardt	2019	Parallel Play: Startups, Nascent Markets, and Effective Business-model Design	Administrative Science Quarterly
McDonald & Gao	2019	Pivoting Isn't Enough? Managing Strategic Reorientation in New Ventures	Organization Science
McGinn, D	2012	Too Many Pivots, Too Little Passion What's wrong with today's entrepreneurism	Harvard Business Review

McMullen, JS	2017	Are you pivoting away your passion? The hidden danger of assuming customer sovereignty in entrepreneurial value creation	Business Horizons
Mmbaga et al.	2020	A review of and future agenda for research on identity in entrepreneurship	Journal of Business Venturing
Nair & Blomquis	2020	The temporal dimensions of business incubation: A value-creation perspective	International Journal of Entrepreneurship and Innovation
O'Connor & Klebahn	2011	The Strategic Pivot: Rules for Entrepreneurs and Other Innovators	Harvard Business Review
Ojala, A	2019	Business models and opportunity creation: How IT entrepreneurs create and develop business models under uncertainty	Information Systems Journal
Ojasalo & Ojasalo	2016	Lean Service Innovation	Service Science
O'Reilly & Binns	2018	The three stages of disruptive innovation: Idea generation, incubation, and scaling	California Management Review
Patvardhan & Ramachandran	2020	Shaping the Future: Strategy Making as Artificial Evolution	Organization Science
Peralta et al.	2020	A framework proposition to identify customer value through lean practices	Journal of Manufacturing Technology Management
Pillai et al.	2020	The origins of firm strategy: Learning by economic experimentation and strategic pivots in the early automobile industry	Strategic Management Journal
Preller et al.	2020	Entrepreneurial visions in founding teams: Conceptualization, emergence, and effects on opportunity development	Journal of Business Venturing
Ratten	2020	Coronavirus (covid-19) and entrepreneurship: changing life and work landscape	Journal of Small Business and Entrepreneurship
Rodríguez et al.	2020	Customer Resistance to Tourism Innovations: Entrepreneurs' Understanding and Management Strategies	Journal of Travel Research
Seggie et al.	2017	Combining big data and lean startup methods for business model evolution	AMS Review
Shankar & Clausen	2020	Scale quickly or fail fast: An inductive study of acceleration	Technovation
Shepherd	2020	COVID 19 and Entrepreneurship: Time to Pivot?	Journal of Management Studies
Shepherd & Gruber	2020	The Lean Startup Framework: Closing the Academic–Practitioner Divide	Entrepreneurship: Theory and Practice
Smith & Bergman	2020	The other side of the coin: Investor identity and its role in resource provision	Journal of Business Venturing Insights
Snihur & Zott	2019	The Genesis and Metamorphosis of Novelty Imprints: How Business Model Innovation Emerges in Young Ventures	Academy of Management Journal
Sonta-Draczkowska & Mrozewski	2019	Exploring the Role of Project Management in Product Development of New Technology-Based Firms	Project Management Journal
Stayton & Mangematin	2016	Startup time, innovation and organizational emergence: A study of	Journal Of International Entrepreneurship

		USA-based international technology ventures	
Teece &Linden	2018	Business models, value capture, and the digital enterprise	Journal of Organization Design
Teece, D	2017	Business models and dynamic capabilities	Long Range Planning
Tekic & Koroteev	2019	From disruptively digital to proudly analog: A holistic typology of digital transformation strategies	Business Horizons
Trimi & Berbegal-Mirabent	2012	Business model innovation in entrepreneurship	International Entrepreneurship and Management Journal
Vogel, P	2017	From Venture Idea to Venture Opportunity	Entrepreneurship: Theory and Practice
von Briel et al.	2018	Not all digital venture ideas are created equal: Implications for venture creation processes	The Journal of Strategic Information Systems
Warnick et al.	2018	Passion for entrepreneurship or passion for the product? A conjoint analysis of angel and VC decision-making	Journal of Business Venturing
Wood et al.	2019	Full Steam Ahead or Abandon Ship? An Empirical Investigation of Complete Pivot Decisions	Journal of Small Business Management
Yang et al.	2019	Search and execution: examining the entrepreneurial cognitions behind the lean startup model	Small Business Economics
Young et al.	2018	Stability vs. flexibility: The effect of regulatory institutions on opportunity type	Journal of International Business Studies
Younger & Fisher	2020	The exemplar enigma: New venture image formation in an emergent organizational category	Journal of Business Venturing

APPENDIX B – CONCEPTUAL STREAMS OF PIVOTING

Stream	Description	Example	Theoretical background	Main Findings	Opportunities for future research
Design	The pivot's formulation is a deliberate process in which entrepreneurs strategize and control its execution	Liu & Bell, 2019; Patvardhan & Ramachandran, 2020	* Strategic management (discovery-driven planning (McGrath and MacMillan 1995, 2009), real option strategies (McGrath 1997) * Flexibility (Stigler, 1939; Hart, 1937; Harrigan, 1985) *Theory of disruption (Christensen, 2006) * Experimentation (Nicholls-Nixon et al., 2000; Gersick, 1994) * Strategy (Morris et al., 2005)	* Entrepreneurs when building their company should adopt a dynamic perspective strategic approach in the current constantly changing business environment. The authors propose the Business model change (BMC) as a lean process approach consisting in 4 stages: Identify the strategic change needed; Prepare the company; Prepare the customers and testing; and BMC execution (Balocco et al., 2019) * A scientific approach (Designing and conducting rigorous experiments, valid and reliable metrics, evidence-based decisions, etc.) improves precision, reduces the odds of pursuing projects with false positive returns, increases the odds of pursuing projects with false negative returns. Therefore, a scientific approach increases firm performance, because entrepreneurs can recognize when their projects exhibit low or high returns. Likewise, entrepreneurs are able to establish clear decisions rule regarding to exits and pivots to new ideas. (Camuffo et al., 2020) * Purposefully underdetermined business model helps entrepreneurs' activities co-evolve with a changing market. Pausing enables the "passive learning"—learning by waiting and observing—that can yield unanticipated insights (McDonald & Eisenhardt, 2019) * Firm's leaders can challenge the status quo and leverage the organization to nudge the evolution of the business landscape toward a preferred direction (Patvardhan & Ramachandran, 2020)	* To explore the role of the lean thinking to develop business strategy in more structured companies (Balocco et al., 2019) * To identify the key mechanism underlying how a scientific approach improves operations, and how this approach provides learning. (Camuffo et al., 2020) * Exploring where cooperation emerges—for example, in regulated markets like satellite radio, or among very small entrants in a market dominated by large firms (McDonald & Eisenhardt, 2019)
Cognitive	The focal point lies on the subjectivity of the entrepreneur's and how their judgment, perceptions, self-concepts, rationality, experience, and behavior lead the decision and actions to pivot	Kirtley & O'Mahony, 2020; Wood et al., 2019; Grimes, 2018	* Capabilities and cognition (Tripsas & Gavetti, 2000; Simsek et al., 2015) * Bounded rationality (Simon, 1947; Gavetti and Levinthal, 2000) * Learning from failure (McGrath, 1999; Shepherd & Sutcliffe, 2011) * Behavioral decision theory (Cyert and March 1963; Kahneman and Tversky, 1987 * Cognivitve attributes (Duckworth et al. 2007; Schachar et al., 1993) * Biases and cognition in entrepreneurship (Busenitz & Barney, 1997; Cardon et al., 2005; Crilly, 2015; Stempfle, 2011; Psychological ownership (Pierce et al., 2001)	* Entrepreneurs must actively balance persistence with flexibility; however, this task is influenced by (i) the commitment with the ideas, (ii) the expertise, (iii) access to information, (iv) the availability of resources, and (v) the preference of orientation: product or the market (Crilly, 2018) * Founding teams with more founding and industry experience can more effectively defend organizational image (OI) after negative feedback. Negative feedback can weaken OI because it indicates that the venture will not meet its expected goals; but also offer an opportunity for legitimizing distinctiveness. (Domurath et al., 2019) * Entrepreneurs must balance external demands for adaptation with the need to retain a coherent sense of self and purpose during the creative revisions (i.e. pivots). Individuals that respond to such feedback, must consider adjusting their ideas and also the extent to which their self-concepts are rooted in those ideas. The psychological ownership of ideas, collective sensemaking, and prior experience shape the creative revision process (Girmes, 2018) * Decision makers chose to change their strategy only when new information conflicted with or altered their beliefs (Kirtley & O'Mahony, 2020) * Pivoting can either support or undermine the entrepreneur's passion. Entrepreneurs should consider carefully to what extent their passion may be compromised. (McMullen, 2017) * For practitioners and students, it is important to understand that failure can occur given the high uncertainty involved in starting a firm and that failure typically hurts, but they also need to understand that failure (i.e., fail quickly and cheaply) can be an important means of managing uncertainty. (Shepherd & Gruber, 2020)	*Future research could explore details of the process of sensemaking of latent logic conflicts and shifts in decision-making logic (Brenk et al., 2019) * Future studies considering the distinction between defending or adapting the venture's organizational image (OI) and collect more fine-grained data on founding teams' knowledge and competencies (Domurath et al., 2019) * Which specific types of feedbacks are most likely to trigger creative revisions. Is there any relationship between the feedback type with the strategy adopted by the entrepreneur. How increased accountability and resource dependence in later stages might challenge the firm's identity. How the revision process affects the opportunity beliefs and the passion of the entrepreneurs. (Grimes, 2018) *Future research should examine whether both additions and exits are necessary to produce a pivot. What types of information are more likely to lead decision makers to expand their beliefs. Identifying

				* The choice to stay the course or move to a totally new offering is cognitively underpinned by the alignment between a decision maker's aspiration and realized outcomes. The likelihood of complete pivots increases significantly when the magnitude of the miss (revenues compared to plan) is high, when the length of the runway (cash available/burn rate) is short, and when the attribution for the miss (reason for customer misreads) is a failure of anticipation. Complete pivots imply the abandonment and complete replacement of the offering, as opposed to incremental iteration of the offering (associated with new product development) (Wood et al., 2019)	(Kirtley & O'Mahony, 2020) * What mechanisms could be used in order to help entrepreneurs to prioritize their interests. How the entrepreneur's interests may vary over time, and how they can affect the decisions to pivot. How the passion of the other firm's members can be affected by pivots. (McMullen, 2017) * More research that considers termination as a decision alternative along with the pivot- or-persevere decision. The impact of individual characteristics such as self-efficacy, grit, psychological ownership, identity, and cognitive biases. Future research can explore the information signals indicating the need for specific pivots; and the changes pivots cause in startups' business models and communities. Future research can explore the conditions under which pivoting (in its various forms and degree) is more likely given information indicating the need for change, including founding team composition and the culture of emerging organizations. Develop richer studies of the antecedent, mechanisms, and consequences of pivots. (Shepherd & Gruber, 2020)
Negotiation	This line is concerned with the analysis of the negotiation between a firm and its stakeholders, aiming to mitigate the negative effects of the pivots, decrease resistance, and strengthen relationships	Hampel et al., 2019; McDonald & Gao, 2019; Cohen et al., 2019	* Organizational Identity (Albert & Whetten, 1985; Gioia, Patvardhan, Hamilton, & Corley, 2013) * Identification management and how stakeholders relate to the firm's identity (Besharov, 2014; Pratt, 2000) * New venture creation (Vohora et al., 2004; McMullen &Dimov, 2013; Timmons, 1977; Reed and Storrud-Barnes 2010; Shane 2003) * Venture investors (Murnieks et al., 2016) * Resource based view (Alvarez & Barney, 2007; Barney, 1991)	* The pivots can undermine the firm's relationship with its key stakeholders on which the firm depends for resources. The authors drew a distinction between 'early stage pivots' (conceptual pivots) and 'later staged pivots' (living pivots, when exists a major potential hazard), because the underlying dynamics of each of them are very different. There are two negative reactions from stakeholders during pivots: doubting and attacking. Ventures can reduce the affective-hostility of stakeholders and improve the relationships with them by employing the 'identification reset work' which consists in (1) exposing their struggles, thus creating empathy, and (2) mythologizing the product and the technology, highlighting the importance of making the necessary changes. (Hampel et al., 2019) * entrepreneurs should also manage the way they communicate the pivots. This implies to formulate strategies to minimize the potential penalties. The authors identified a sequence of stratagems that may enable entrepreneurs to alter strategy minimizing the counter-productive effects: Anticipating Reorientation (crafting an abstract frame to create room to maneuver); Justifying Reorientation (bridging justifications to signal frame continuity); and Staging Reorientation (pairing pivots with conciliatory rhetoric making transformation seem less abrupt). (McDonald & Gao, 2019) * These emerging trends in business model design highlight the importance of not only	* In which way, a strong supportive community may prevent the startup to undertake pivots. How competitors can use pivotal situations for their own interests. How suppliers, partners, and complementors (the other actors of the ecosystem) can react to these situations. How new ventures that face polarized affective stakeholder responses manage identification relationships during pivots. (Hampel et al., 2019) * How the reorientations may affect the suppliers, partners, and complementors (the other actors of the ecosystem), and how new ventures should communicate and manage them. What are the implications of the reorientations within the startup and within the entrepreneurs. In what extent, the stratagems could be applied to communicate reorientations inside the firm. (McDonald & Gao, 2019)

				listening to customers but also co-create new values or products with customers (Trimi & Berbegal-Mirabent, 2012)	* Is there any connection between firm performance and how the business model is designed? Does an accurate business modelling design process make a new venture more robust or more successful? (Trimi & Berbegal-Mirabent, 2012)
Environmental	Pivots are the firm's ultimate response to external challenges and changes; pivots are totally dependent on environmental factors such a competitors, customers' preferences, regulators, and other actors in the environment	Pillai et al., 2020; Bajwa et al., 2017; Young et al., 2018	* Entrepreneurial Opportunity and action (Alvarez and Barney, 2007; Shane and Venkataraman, 2000; McMullen and Dimov, 2013; Shane, 2000; Wood and Williams, 2014) * Contingency Theory (Hanisch & Wald, 2012; Sarasvathy, 2001) * Institutional environments (Henisz, 2002; Makhija & Stewart, 2002) * Opportunity creation theory (Alvarez & Barney, 2007; Ardichvili et al., 2003; Chesbrough, 2010)	*Negative customer reaction and flawed business model are the most common factors that trigger pivots (Bajwa et al., 2017) * experimentation helped to identify unanticipated lessons related to customer preferences, challenges of use, techniques and processes of design, manufacturing, logistics and sale (Pillai et al., 2020). Start-ups can use business experimentation to identify the most promising and disruptive business model in the market (Bocken et al., 2016) * Firms that pivoted were more likely to survive and improve their offerings (Pillai et al., 2020) * Entrepreneurs should closely approach to their potential customers to real know them (O'Connor & Klebahn, 2011) * In some cases, the new venture needs to be patient and await the right moment to learn how to match the market capacity with a business model (Axelson & Bjurstrom, 2019) * Experimenting and testing the overall business model, rather than products and services, is a core step of Business Model Innovation in early stage digital startups (Ghezzi & Cavallo, 2020) * One of the major difficulties for entrepreneurs is to determine when a product is ready for launch (Sonta-Draczkowska & Mrozewski, 2019) * Institutions (regulators, government) that promote flexibility, enable entrepreneurs to iterate and pivot in the decision-making process, and ultimately, foster the formation of innovative opportunities (Young et al., 2018) * External changes, and particularly technological changes, may impact the evolution of the business model. To learn from quickly-changing situations and to analyze new technologies is essential for the firm's survival (Ojala, 2016)	* What aspects of the context can influence the decision to pivot. How different stages of product development might vary the decision to pivot. In which stage pivot most probably occurs, and what is the cost of pivoting. How team size and structure are related to different types of pivots. Is there any causal-effect patterns between triggering factors and pivots. (Bajwa et al., 2017) * why do some firms experiment and others do not? Does the timing of strategic pivots change outcomes? How do firms evaluate the outcomes of strategic pivots? (Pillai et al., 2020) * To analyze the exploration and exploitation practices of NTBFs in the NPD (Sonta-Draczkowska & Mrozewski, 2019) * what role the economy and policymakers can play in the development of entrepreneurial opportunities (Young et al., 2018) * To examine growth-oriented start-ups in different contexts, such as different industries and/or countrie (De Cock et al., 2019)

APPENDIX C – COGNITIVE-AFFECTIVE ATTRIBUTES AND BIASES INVOLVED IN ENTREPRENEURIAL DECISION-MAKING

Cognitive-affective attributes	Author(s)	Definition / Reference
Cognitive adaptability/flexibility	Haynie et al. (2012); Furr et al. (2012)	"The ability to effectively and appropriately evolve or adapt decision policies (i.e., to learn) given feedback (inputs) from the environmental context in which cognitive processing is embedded" (Haynie et al., 2012, p. 238).
Cognitive closure	Uygur & Kim (2016)	"The tendency to be more likely to form judgments based on a limited information set" (Uygur & Kim, 2016, p. 176).
Cognitive feedback	Haynie et al. (2012)	"Involves information conveyed to the decision maker about the relations in the environment, relations perceived by the person, and relations between the environment and the person's perceptions" (Haynie et al., 2012, p. 242).
Cognitive legitimacy	Grégoire et al. (2011)	"Knowledge about the new activity and what is needed to succeed in an industry "(Grégoire et al., 2011, p. 1464).
Cognitive style	Mueller & Shepherd (2016)	"Refers to the consistent approach an individual takes in organizing and processing information during learning" (Mueller & Shepherd, 2016, p. 464)
Competitiveness	Ürü et al. (2011)	The tendency "to be aggressive and proactive thus entrepreneurs behave likely to competitive" (Ürü et al., 2011, p. 542).
Counterfactual thinking	Hisrich et al. (2007); Baron (2004); Arora et al. (2013); Frederiks et al. (2018);	Ability to recreate possible future alternatives (Baron, 2004).
Empathic accuracy	McMullen (2015)	"Ability to accurately infer the specific content of another person's thoughts and feelings (Ickes, 1993, p. 588).
Entrepreneurial capabilities	Hisrich et al. (2007); Abdelgawad et al. (2013)	"The ability to identify new opportunities and develop the resource base needed to start a firm" (Hisrich et al., 2007, p. 584).
Entrepreneurial cognition	Uygur & Kim (2016); Katz & Shepherd (2003); de Mol et al. (2015), Chaston & Sadler-Smith (2012)	"The knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth" (Uygur & Kim, 2016, p. 171).
Entrepreneurial decisiveness	Uygur & Kim (2016)	"Is the tendency of individuals to make decisions quickly in venturing tasks" (Uygur & Kim, 2016, p. 176).
Entrepreneurial intuition	Blume & Colvin (2011)	Judgments affectively charged that arise through rapid, nonconscious, and holistic associations involving in the entrepreneurial process (Blume & Colvin, 2011).
Entrepreneurial passion	Yamakawa et al. (2015); Warnick et al. (2018); Hsu et al. (2017); Crommelinck et al. (2016)	Passion for creating and developing new firms (Warnick et al., 2018).
Entrepreneurial persistence	Mattingly et al. (2016)	"Refers to entrepreneurs choosing to continue with an entrepreneurial opportunity regardless of the counter influences of enticing alternatives that are observed in the environment " (Mattingly et al., 2016, p. 1236).
Entrepreneurial resilience	Corner et al. (2017)	"The capacity or ability to maintain relatively stable, healthy levels of psychological and emotional functioning despite experiencing trauma or serious loss" during the entrepreneurship process (Corner et al., 2017, p. 688).
Entrepreneurial self-efficacy	Uygur & Kim (2016); Kasouf et al. (2015); Wennberg et al. (2013); Blume & Colvin (2011); Yamakawa et al. (2015)	"Refers to a person's confidence about his/her ability to perform the various tasks and roles relevant to entrepreneurship" (Uygur & Kim, 2016, p. 175).
Explanatory style	Kasouf et al. (2015)	"The mechanism of how people attribute the positive and negative experiences in their lives" (Kasouf et al., 2015, p. 8).
Extraversion	de Jong et al. (2013); Shane & Nicolaou (2013)	"Refers to assertiveness and dominance, as well as sociability, gregariousness, and talkativeness (…) extraverted leaders tend to influence the environment by scanning for opportunities, showing initiative, taking action, and persuading people about task-related issues" (de Jong et al., 2013, p. 1830).
Innovativeness	Ürü et al. (2011); Dai et al. (2016)	Refers to the tendency in which entrepreneurs look to getting involved in innovative endeavors (Ürü et al., 2011).
Intuition	Calabretta, Gemser, & Wijnberg (2017); Dane & Pratt (2007)	"a decision-making mechanism that relies on rapid, non-conscious recognition of patterns and associations to derive affectively charged judgments" (Calabretta, Gemser, & Wijnberg, 2017p. 366)
Knowledge relatedness	Wood & Williams (2014)	"Is defined as the degree to which the knowledge required to identify, evaluate, and exploit an opportunity is similar to the

		knowledge the entrepreneur already possesses" (Wood et al., 2014, p. 257).
Metacognition	Mitchell et al. (2007); Haynie et al. (2012); Baron (2009); Byrne & Shepherd (2015)	"Refers to those experiences that are affective, based on cognitive activity, and serve as a conduit through which previous experiences, memories, intuitions, and emotions may be employed as resources in the process of making sense of a given decision context" (Haynie et al., 2012, p. 239).
Metacognitive experience	Haynie et al. (2012); Mattingly et al. (2016)	"Represents past events that are affective, based on cognitive activity, and serve as a conduit through which memories, intuitions and emotions may be employed as resources given the process of making sense of a given task " (Haynie et al., 2012, p. 242).
Metacognitive knowledge	Haynie et al. (2012); Mattingly et al. (2016); Wood & Williams (2014); de Mol et al. (2015); Baron et al. (2016)	"Is defined as the extent to which the individual relies on what is already known about oneself, other people, tasks, and strategy when interpreting, planning, and implementing goals to manage a changing environment" (Haynie et al., 2012, p. 241).
Need for achievement	Hisrich et al. (2007); Ürü et al. (2011); Dimov (2007); Shane et al. (2003); Zhang & Bruning (2011)	"A desire to influence and control the context in which a person operates because he/she seemed to be ambitious, hard working, competitive, keen to improve their social standing, and he/she places high value on achievements" (Ürü et al., 2011, p. 540).
Openness	de Jong et al. (2013); Liñán et al. (2016); Shane & Nicolaou (2013); Zhao & Jung (2017)	"Refers to whether people accept new experiences, are interested in unusual thought processes, and possess creative tendencies" (de Jong et al., 2013, p. 1829).
Opportunity prototype	Mueller & Shepherd (2016)	"Refers to a cognitive representation of the ideal business opportunity, composed of the attributes an individual has found to be most desirable and predictive of success" (Mueller & Shepherd, 2016, p. 463).
Opportunity refinement competency	Hoskisson et al. (2011)	"The discovery or enactment of an opportunity and the ability to further refine and develop the opportunity into a clearly articulated and commercially viable business concept" (Hoskisson et al., 2011, p. 1152).
Optimism	Hmieleski & Baron (2008); Ürü et al. (2011); Ucbasaran et al. (2010)	Refers to the tendency "to hold positive expectancies for the future" (Dölarslan et al., 2017, p. 4).
Passion	Cardon et al. (2015); Cardon et al. (2009); McMullen (2017); Warnick et al. (2018); Cardon et al. (2017)	"Concerns intense positive feelings for activities that are central and meaningful to an individual's self-identity" (Cardon et al., 2015, p. 374).
Pattern recognition	Baron (2004)	"Identification of a complex array of stimuli which, together, allow perceivers to recognize an object or a complex pattern of objects or events" (Baron, 2004, p.227).
Performance persistence	Mattingly et al. (2016)	"Refers to the increased likelihood of succeeding in a subsequent venture for those individuals who had success in a previous venture" (Mattingly et al., 2016, p. 1239).
Perspective taking	Frederiks et al. (2018)	"Is the cognitive capacity to consider the world from another individual's viewpoint" (Frederiks et al., 2018, p. 4).
Prospective thinking	Frederiks et al. (2018)	"The ability to ‘pre-experience’ the future by simulating it in our minds" (Frederiks et al., 2019, p. 4).
Relatedness	Shepherd & Cardon (2009)	"It refers to feeling connected to, and understood by, others" (Shepherd & Cardon, 2009, p. 929).
Risk-taking propensity	Hisrich et al. (2007); De Carolis et al., (2009); Ürü et al. (2011); Dimov (2007)	Refers to the tendency of individuals frame decisions as 'risk-taking' under conditions of uncertainty (De Carolis et al., 2009).
Self-compassion	Shepherd & Cardon, (2009)	Is the "self-awareness that one is experiencing a sense of loss and intention to respond to the loss by doing something about it" (p. 933). Self-compassion comprises self-kindness, common humanity, and mindfulness. (Shepherd & Cardon, 2009).
Self-confidence	Brundin & Gustafsson (2013)	"Refers to a belief in oneself" (Brundin & Gustafsson, 2013, p. 571).
Self-directed learning	Mattingly et al. (2016)	"Refers to a metacognitive ability to "connect the dots" between what one knows, what one wants to know, and how they can get there" (Mattingly et al., 2016, p. 1238).
Self-efficacy	Arora et al. (2013); Dölarslan et al. (2017); Dimov (2007); Shane et al. (2003); Warnick et al. (2018)	"Belief in one’s ability to muster and implement necessary resources, skills, and competencies to attain a certain level of achievement on a given task" (Baron, 2004, p.224).
Self-efficacy in opportunity recognition (SOR)	Fernández-Pérez et al. (2016)	"Reflects the perceived ease or difficulty of identifying or defining opportunities to act upon an entrepreneurial idea" (Fernández-Pérez et al., 2016, p. 299).
Self-esteem	Jenkins et al. (2014); Arora et al. (2013)	Good feelings and emotions about oneself (Jenkins et al., 2014).

Self-kindness	Shepherd & Cardon (2009)	"It refers to extending caring and understanding to oneself rather than harsh judgment and self-criticism (after project failure'" (Shepherd & Cardon, 2009, p. 934).
Self-regulation	Hmieleski & Baron (2008); Van Gelderen (2012); Crommelinck et al. (2016)	"The ability to adjust one's learning process in the face of feedback" (Mitchell et al., 2007, p. 14).
Sensation seeking	Nicolaou et al. (2008)	It is a "personality trait that creates a need for novel experiences" (Nicolaou et al., 2008, p. 9).
Sensing capability	Abdelgawad et al. (2013); Jiao et al. (2013); Dai et al. (2018); Bingham & Kahl (2014)	Centers on seeing and scanning information about market, industry and technology changes or opportunities (Abdelgawad et al., 2013).
Social cognition	Mitchell et al. (2007)	"The ways in which we interpret, analyze, remember, and use information about the social world" (Mitchell et al., 2007, p.5).
Start-up motivation	Hopp & Stephan (2012)	"Refers to the entrepreneurs' willingness to exert effort in the venture creation process to make the venture work" (p. 922).
Strategic Flexibility (firm)	Dai et al. (2018); Fernández-Pérez et al. (2016); Fernández-Pérez et al. (2012); Renato & Naguib (2016)	"Is an organisation's capability to identify major changes in its external environment, to commit resources quickly to new courses of action in response to change, and to recognise and act promptly when it is time to halt or reserve the commitment of such resources " (Fernández-Pérez et al., 2016, p. 297).
Successful intelligence	Hisrich et al. (2007); Baum & Bird (2009)	"Consists of practical, analytical, and creative intelligence that (…) enables and motivates successful entrepreneurial behavior" (Baum & Bird, 2009, p. 397).
Tolerance for ambiguity	Shinnar et al. (2012)	"The propensity to view situations without clear outcomes as attractive rather than threatening" (Shane et al., 2003, p. 265).
Tolerance for negative experiences	Muehlfeld et al. (2017)	In spite of adversity, is "a stronger tendency to continue sampling information about alternatives" (Muehlfeld et al., 2017, p. 541).

Cognitive Biases	**Author(s)**	**Definition / Reference**
Anti-failure bias	Yamakawa et al. (2015)	The tendency to focus on success and to avoid failure at all costs (Yamakawa et al., 2015).
Availability	Zhang & Cueto (2017)	"Use a familiar situation as a cognitive shortcut for making decisions" (Zhang & Cueto, 2017, p. 427).
Confirmation bias	Baron (2004); McGrath (1999)	"Information that confirms our current beliefs is noticed, processed, and remembered more readily than information that disconfirms our current beliefs" (Baron, 2004, p.226).
Design fixation	Crilly (2018)	"Refer to a blind adherence to a set of ideas or concepts limiting the output of conceptual design" (Crilly, 2018, p. 52).
Escalation of commitment	Zhang & Cueto (2017); McCarthy, Schoorman, & Cooper (1993)	"Persist unduly with unsuccessful initiatives or courses of action" (Zhang & Cueto, 2017, p. 427).
Fear of failure	Kollmann et al. (2017); Wennberg et al. (2013); Wood et al. (2014); Crifo & Sami (2008); Hacklin et al. (2018); Shinnar et al. (2012); Morgan & Sisak (2016)	"It is a motive that energizes and directs individuals' behavior away from critical, negative situations in which failure is likely" (Kollmann et al., 2017, p. 283).
Illusion of control	Baron (2004); Zhang & Cueto (2017); De Carolis et al. (2009)	"The belief that the skills could increase performance even in situations where chance plays a large role" (Baron, 2004, p. 226).
Law of small numbers	Baron (2004); Zhang & Cueto (2017)	"The tendency to use a small sample of information as a basis for firm conclusions" (Baron, 2004, p.226).
Locus of control	Dölarslan et al. (2017); Dyer et al. (2008); Ürü et al. (2011); Shane et al. (2003); Arora et al. (2013); Zhang & Bruning (2011)	"The belief of whether or not one's outcomes depend mainly on one's own actions or on factors not under one's control" (Dölarslan et al., 2017, p. 2)
Need for closure	Schenkel et al. (2009)	"Desire for an answer on some topic, any answer as opposed to confusion and ambiguity" (Schenkel et al., 2009, p. 52).
Neuroticism	de Jong et al. (2013); Bandera & Passerini (2020)	"Refers to a person's tendency to be tense, defensive, thin-skinned, and worrisome" (de Jong et al., 2013, p. 1830).
Overconfidence	Zhang & Cueto (2017); Dölarslan et al. (2017); Dyer et al. (2008); Hmieleski & Baron (2008); Schenkel et al. (2009); Blume & Colvin (2011); Dai et al. (2018); Fang He et al. (2018); Simon & Shrader (2012);	"Perceive a subjective certainty higher than the objective accuracy" (Zhang & Cueto, 2017, p. 427).

	Invernizzi et al. (2017); Artinger & Powell (2016); Cain et al. (2015)	
Over-optimism	Zhang & Cueto (2017); Hmieleski & Baron (2008); Parker (2009);Hmieleski & Baron (2009); Wolfe & Shepherd (2015); Ucbasaran et al. (2010)	"Overestimate the likelihood of positive events and underestimate the likelihood of negative events" (Zhang & Cueto, 2017, p. 427).
Over-pessimism	Kirzner (1997)	“Are those [situations] in which superior opportunities have been overlooked” (Kirzner, 1997, p. 83).
Persistence bias	Cardon et al. (2015); Yamakawa et al. (2015); Cardon et al. (2009); Batra (2016); Denrell and March (2001)	"Refers to the tendencies of organizations to stick to their past strategies" (Batra, 2016, p. 311).
Planning fallacy	Hisrich et al. (2007); Baron (2004); Zhang & Cueto (2017)	"Refers to the tendency of making predictions about how much time will be needed to complete a future task display an optimism bias and underestimate the time needed " (Baron, 2004, p. 235).
Psychological ownership	Grimes (2018)	“that state in which individuals feel as though the target of ownership (material or immaterial in nature) or a piece of it is ‘theirs’” (Grimes, 2018, p. 1694).
Self-serving attribution	Zhang & Cueto (2017); Parker (2009); Dai et al. (2018); McGrath (1999); Hisrich et al. (2007)	"Take credit for success while deny responsibility for failure" (Zhang & Cueto, 2017, p. 427).
Similarity	Zhang & Cueto (2017)	"Tend to evaluate more positively those who are more similar to themselves" (Zhang & Cueto, 2017, p. 427).
Solution/product blind adherence	Eggers (2016)	The tendency to focus on a determined product or technology, neglecting the feedbacks from markets and customers, and diminishing the propensity to change. (Eggers, 2016)
Status quo	Zhang & Cueto (2017); Batra (2016)	"Repeat a previous choice overly often" (Zhang & Cueto, 2017, p. 427).
Sunk costs fallacy	Baron (2004); Crilly (2018)	"The tendency to stick with decisions that generate initial negative outcomes, the tendency to ‘‘stay the course’’ in the face of initial, negative results" (Baron, 2004, p.235).
Uncertainty avoidance	Wennberg et al. (2013)	"Refers to the extent to which individuals in a society feel threatened in ambiguous situations" (Wennberg et al., 2013, p. 761).
Unwarranted optimism	Baron (2004)	"The tendency of persons who choose to become entrepreneurs to underestimate the amount of risk involved in starting a new venture" (Baron, 2004, p. 224).

APPENDIX D – DATA COLLECTION INSTRUMENT

- **INTRODUCTION**
  .1. Brief history of the firm
  .2. Founders
  .3. Entrepreneurial team
  .4. Entrepreneurial opportunity (former and current business idea)
  .5. Brief offering description
  .6. Evolution of the entrepreneurial opportunity
  .7. Which are the decisive moments, decisions, or events in the startup?
- **RECOGNIZING THE NEED FOR PIVOTING (FAILURE)**
  .1. How did you become aware of the need for pivoting? (external/internal)
  .2. Do you have any monitoring performance mechanism?
- **PERCEPTION AND RESPONSE TO THE FAILURE**
  .1. What was the analysis of this failure situation, what was the cause?
  .2. What was the subsequent response or attitude to this failure?
  .3. Which were the alternatives to address this situation? (persist, pivot, exit)
  .4. Who were involved in that response to the failure? (third parties)
- **ACTIONS AND RESULTS**
  .1. Which were the changes undertaken for pivoting?
  .2. How did you manage the changes? (personal-level, startup-level, ecosystem-level)
  .3. What were the consequences of these changes?
  .4. Could you say that the pivot was successful? Why?
    .4.1. Do you have any indicator in this regard?
  .5. Could you describe how the pivot process was for you? (feelings, emotions)
    .5.1. Was it difficult to you and your team to take on this process?
    .5.2. How do you think your beliefs about the business have changed?
    .5.3. Did you feel very committed to the initial idea?
  .6. Did you perceive that the pivotal moments were decreasing over time? Why?
- **THE PIVOTING PROCESS**
  .1. Why do some entrepreneurs pivot easily and others do not?
  .2. Which capabilities and characteristics do you consider fundamental to pivot? Why?
  .3. There seems to be the notion that an entrepreneur must be persistent, even stubborn with his/her ideas, how to deal with this notion and the capacity for change and to evolve?

APPENDIX E – INFORMED CONSENT TERM

APÊNDICE E – TERMO DE CONSENTIMENTO

TITULO DO PROJETO: Pivoting In Startups: A Judgment Based View

(O Pivotamento Nas Startups: Uma visão baseada no Julgamento)

1. Natureza da pesquisa: Esta pesquisa tem o objetivo de identificar como as startups pivotam, como os empreendedores decidem pivotar e quais as consequências associadas a esta decisão.
2. Participantes: Empreendedores e fundadores de startups.
3. Envolvimento na pesquisa: Ao participar deste estudo o Sr. (Sra.) permitirá que a pesquisadora utilize os dados coletados durante a entrevista para a construção de sua pesquisa de dissertação. Sempre que quiser poderá pedir mais informações sobre a pesquisa através do e-mail de contato. Caso deseje em qualquer momento desistir da participação do estudo isto será permitido.
4. Sobre as entrevistas: Serão gravadas, transcritas e apresentadas ao entrevistado (a) para apreciação.
5. Confidencialidade: O entrevistado não terá exposta sua identidade nem nenhum dado pessoal. Nos documentos da dissertação cada participante terá um nome genérico, por exemplo: "Entrevistado 1".

Termo de consentimento livre e esclarecido

Tendo em vista os itens acima apresentados, eu, de forma livre e esclarecida, manifesto meu consentimento em participar da pesquisa. Declaro que recebi cópia deste termo de consentimento, e autorizo a realização da pesquisa e a divulgação dos resultados dos dados obtidos neste estudo.

_____ _____

Nome do participante Ximena Alejandra Flechas Chaparro

_____

Assinatura do participante

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