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Master's Thesis

Student Entrepreneurship and the Venture Creation Process: A Competency Perspective.

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Management Summary

This thesis examines student entrepreneurship, a phenomenon of increasing societal and economic importance. Student entrepreneurs often face ambivalent institutional environments, in which their universities, though supportive of student entrepreneurship, introduce inflexible academic obligations. In addition, the topic of student entrepreneurship is under-researched, and the multi-faceted process of creating successful student ventures is, therefore, not well understood. For these reasons, this study aims to contribute to the existing theory on the topic by investigating which competencies student entrepreneurs possess at different stages of the venture creation process and which are necessary for these ventures to succeed. The literature review revealed three entrepreneurial competencies necessary for ventures to obtain private equity funding: the opportunity refinement, championing and leveraging competencies. Additionally, ten semi-structured qualitative interviews were conducted and thematically coded and analyzed. This yielded an overview of the problems, barriers and support structures the interviewees experienced while establishing their ventures. Further, four paths for the development of market credibility by student ventures were outlined and future research possibilities highlighted. Ultimately, it can be stated that while all three entrepreneurial competencies are necessary for student ventures to obtain market credibility, some of them need to be developed by the founding team over time, while others can be provided by external parties.

Keywords: Student entrepreneurship, entrepreneurial competencies, venture creation process.

Content

1. Introduction

1.1. Situation and Complication

Entrepreneurship at its core is about recognizing opportunities in changing markets and economic environments, thereby facilitating economic development and resilience. Facing a multitude of crises, entrepreneurship is ever more important to re-stabilize national economies and present creative solutions to help overcome the challenges of today's world. (Global Entrepreneurship Monitor, 2023)
So far, research on the impacts of entrepreneurship in the university context has mainly covered academic entrepreneurship, namely start-ups founded by faculty and staff, and has identified them as drivers of regional and national economic development (Hayter et al., 2017). Since start-ups by students outnumber the start-ups by faculty members, student entrepreneurship can be regarded as a substantial economic driver (Åstebro et al., 2012). This economic influence stems inter alia from the fact that early first time entrepreneurs are likely to turn into life-long entrepreneurs, which stimulate regional economic growth (Hayter et al., 2017; Holienka et al., 2017). Globally speaking, student entrepreneurship is a means of translating academic knowledge gained in a university context to economic value. Moreover, it creates value beyond economics by influencing society and culture (OECD & European Union, 2018; Politis et al., 2012).
Many universities are well aware of the societal and economic influence of these budding entrepreneurs and strategically aim at supporting these start-ups to fuel innovation and knowledge translation (Bergmann et al., 2016; Block et al., 2017). In the Netherlands, for example, higher education institutions are determined to increase valorization, "i.e. the creation of value from scientific knowledge through economic and/or societal use" (OECD & European Union, 2018, p. 21). Etzkowitz (2001) even called the increased focus of universities on fostering entrepreneurship and their repositioned role in society the 'second academic revolution'. Today, universities are often targeted by policies and are seen as vehicles for making their national economies more innovative and address global challenges (OECD & European Union, 2018).
According to Jansen et al. (2015) universities encourage student entrepreneurship through different education and support structures. These include educating students on entrepreneurship (e.g., showing success stories and offering entrepreneurship modules), stimulating development from initial idea to the business plan (e.g., assistance to the founding team, pitching and business plan support) and, finally, incubating the young ventures (e.g., provide networking opportunities, office space and mentoring) (Jansen et al., 2015).
Despite the extensive efforts of universities to promote entrepreneurship, the entrepreneurial and academic goals of students are often at odds in the university environment (Hayter et al., 2017). It can be difficult for student entrepreneurs to balance a full-time degree program with building a venture,

which often results in them quitting their studies altogether (OECD & European Union, 2018). Options for suspending one's studies or writing a thesis about one's start-up are often less prevalent and start-up support for graduating students or recent graduates is often not possible (OECD & European Union, 2018). Since entrepreneurial intentions are not only influenced by the characteristics of the entrepreneur but also by the perceived difficulties and support in the entrepreneur's environment, the aforementioned obstacles prevent some students from starting a venture even though they might have done so under more favorable conditions (Luthje & Franke, 2003; OECD & European Union, 2018). Additionally, the OECD published research on entrepreneurship at higher education institutions in the Netherlands, stating that while entrepreneurial education is widely offered, new venture support is mostly focused on academic entrepreneurs or external stakeholders, resulting in a gap for students (2018). Overall it can be deduced that decreasing existing barriers and increasing student start-up support is an integral task for universities if they want to attain their own goals of knowledge dissemination and economic development (Hayter et al., 2017).

Another facet in the complexity of student entrepreneurship is that only a small fraction of students become successful entrepreneurs. Globally, roughly 28 percent of students are nascent entrepreneurs, so currently founding a business, and around 11 percent are active entrepreneurs with their already established business (Sieger et al., 2021). In addition, only one in twelve start-up endeavors is successful in the long run (Start-up Genome, 2019). This means that the fraction of students who enter the area of entrepreneurship and who also sustain there successfully is very small. That is why it is important that we know enough about student entrepreneurs and their individual challenges to optimally target policies and programs that encourage student entrepreneurs to build successful ventures and assist them in doing so (Hayter et al., 2017).

Entrepreneurial competencies are known to be crucial to a young venture's success, which is why their development is high up on the entrepreneurial agenda of universities (Brinckmann, 2008; OECD & European Union, 2018; Röpke, 2002). It is useful for universities to take on a competency approach in order to optimally target education, stimulation, and incubation activities for student entrepreneurs (Jansen et al., 2015). In order to foster successful student entrepreneurship, it is important to know which entrepreneurial competencies students have, which ones are lacking, how they can be taught, and which ones can and should be externally supported (Tittel & Terzidis, 2020).

There is a knowledge gap around the formation of entrepreneurial competencies of student entrepreneurs, how they can be externally provided and by whom (Rasmussen et al., 2011).

This study's goal is to find out which competencies a(n) (un-)successful student entrepreneur possesses in different stages of their venture's creation and whether they are needed for the venture to succeed. For this, the venture development framework from Vohora et al. (2004) is used. This

framework describes the early venture development process of a university spinout company as cumulative phases that are separated through different obstacles (Vohora et al., 2004). For this research, the timespan until the 'threshold of credibility' will be looked at, which ends with securing external equity investment.

1.2. Central Research Questions

To reach the study's goal, the first research question is:

> *RQ1: Which entrepreneurial competencies do student entrepreneurs need for their new ventures to reach the credibility threshold?*

The second research question that is investigated is:

> *RQ2: To what extent do the entrepreneurial competencies impact overcoming the threshold of credibility in a student venture?*

Answering these research questions reveals the central entrepreneurial competencies that student entrepreneurs need for their new ventures to achieve credibility on the market. Moreover,
it shows in which stage of venture creation which competencies are relevant and how they can be developed or externally acquired. This provides further insight on opportunities for universities to support student entrepreneurs.

1.3. Theoretical and Practical Contribution

The proposed research aims to contribute to the understanding of the competency creation process by student entrepreneurs. Conducting this research within the scope of the above-mentioned research questions can contribute theoretical knowledge on the identification and impact of the entrepreneurial competencies relevant to the venture creation process by student entrepreneurs.

The approach to this research is an adapted version of Rasmussen et al. (2011) on student entrepreneurship that aims to contribute to closing the theoretical knowledge gap around the creation of successful student ventures as highlighted by several scholars (Jansen et al., 2015; Politis et al., 2012; Tittel & Terzidis, 2020).

Furthermore, it shows how these competencies are developed by illuminating possible internal competency creation processes as well as external competency sources and support structures. By broadening the theoretical knowledgebase on entrepreneurial competencies of students, further research into the topic might become possible.

Besides contributing to the academic knowledge growth, universities can benefit from this research because it illuminates which competencies are how impactful and therefore need to be supported. Further, identifying existing barriers to and support structures of student entrepreneurship might be valuable in determining how additional support structures at universities should look. This is

important for universities, because they might increase the efficiency of the applied resources by building on and refining their existing support structures, while decreasing existing barriers for student entrepreneurs. Overall, this might increase the number of students putting entrepreneurial intentions into practice and raise the success rates of student ventures. Through that, the universities get closer to their mission of being entrepreneurial universities.

2. Theoretical Framework

The structure of this chapter is derived from the first research question '*Which entrepreneurial competencies do student entrepreneurs need for their new ventures to reach the credibility threshold?'.* The chapter starts by presenting the theoretical background on student entrepreneurship, the venture creation process (including the credibility threshold), and the necessary entrepreneurial competencies.

2.1. Student Entrepreneurship

Student entrepreneurship as the core topic of this study can be defined as "students involved in actively running any enterprising activities, i.e. acting upon identified opportunities and developed ideas, and transforming them into value for others" (Holienka et al., 2017, p. 55). In 2015, student entrepreneurship was described as an emergent phenomenon (Marchand & Hermens, 2015) and a recent systematic literature review on the topic proves that there was little research on student entrepreneurship before 2010 (Schimperna et al., 2021).

Surprisingly, student entrepreneurship is underrepresented in research despite the fact that it outnumbers academic entrepreneurship and is recognized as a distinct entrepreneurial group (Politis et al., 2012). This entrepreneurial group differs from other entrepreneurs in the way they accumulate and use resources as well as their reasoning, which is characterized by more flexibility and creativity in problem solving and strategy development (Politis et al., 2012). This characterization uniquely positions student entrepreneurs for operating in dynamic environments and react to emerging issues such as the climate crisis (Lombardi et al., 2022; Russo et al., 2022).

Prior research on student entrepreneurship was recently summarized by Schimperna et al. (2021), providing a fundamental Systematic Literature Review on student entrepreneurship. They focused on how literature of the past twenty years in the field of business, accounting, and management described the role of the entrepreneurial university. The main research areas for student entrepreneurship, according to Schimperna and his team, are the entrepreneurial intention of students, university support for entrepreneurship, and entrepreneurship education and learning (Schimperna et al., 2021). According to Schimperna et al. (2021), students not only need to be knowledgeable, but also skilled to be entrepreneurs. Therefore, universities need to enrich their

theoretical content with more practical teaching methods for facilitating the development of entrepreneurial skills.

Research on student entrepreneurship further demonstrates that entrepreneurial intentions exist at the intersection of individual traits and external factors, the latter of which are easier to influence. That is why perceived barriers can have a significantly negative influence on entrepreneurial intentions while perceived support can have a significantly positive influence on them (Luthje & Franke, 2003). Consequently, universities are in a key position for influencing students' entrepreneurial intentions which they can do by removing barriers and increasing support structures for student entrepreneurship (Schimperna et al., 2021). According to Schimperna et al. (2021) most room for improvement lies in the need for more consistent support structures across universities, more collaboration with policy-makers, and more specialized areas of interest, such as climate change innovation.

Furthermore, Maresch et al. (2016) argue that also entrepreneurial education has a positive effect on entrepreneurial intention. However, the effect on the entrepreneurial intention differs depending on the disciplines of study, which is why the didactics of entrepreneurial education need to be improved to be more targeted (Maresch et al., 2016). Further, Saeed et al. (2015) argue that three levels of factors – individual, organizational (university), and institutional (country) – shape entrepreneurial intention in a multi-level manner. They also discovered differences between genders on the individual level, namely that males and females are motivated by different factors, and thus different strategies are needed to increase their entrepreneurial intentions (Saeed et al., 2015).

More recently, Wright et al. (2017) emphasize the roles of funding mechanisms and investors as well as pre-accelerators and accelerators. Additionally, they argued that the whole ecosystem around successful student entrepreneurship needs to be further explored by research (Wright et al., 2017). Another relevant factor in how student entrepreneurs approach venture creation is their previous entrepreneurial experience (Shirokova et al. (2017).

It can be concluded that student entrepreneurship is a fairly new field of study compared to academic entrepreneurship, even though it is considered to be a distinct group that outnumbers academic ventures. Universities play an important role because they can influence the skills and entrepreneurial intention of students through their educational offer. Further, they can influence students' entrepreneurial intentions by decreasing perceived barriers und increasing specifically targeted support systems. Viewing the most influential research on student entrepreneurship highlights that while entrepreneurial education and intention is well researched, factors for the successful operation

of student ventures need to be investigated in the future. This is very much in line with the research gap identified addressed through this study.

2.2. The Venture Creation Process

As described above, it is useful to learn how students develop ventures and how the success of those ventures can be fostered through active support and the removal of existing barriers. This justifies investigating the venture development process to uncover barriers and identify support structures and possibilities.

One of the most relevant frameworks[1] depicting the process of establishing a venture is the one by Vohora et al. (2004) as shown in Figure 1.

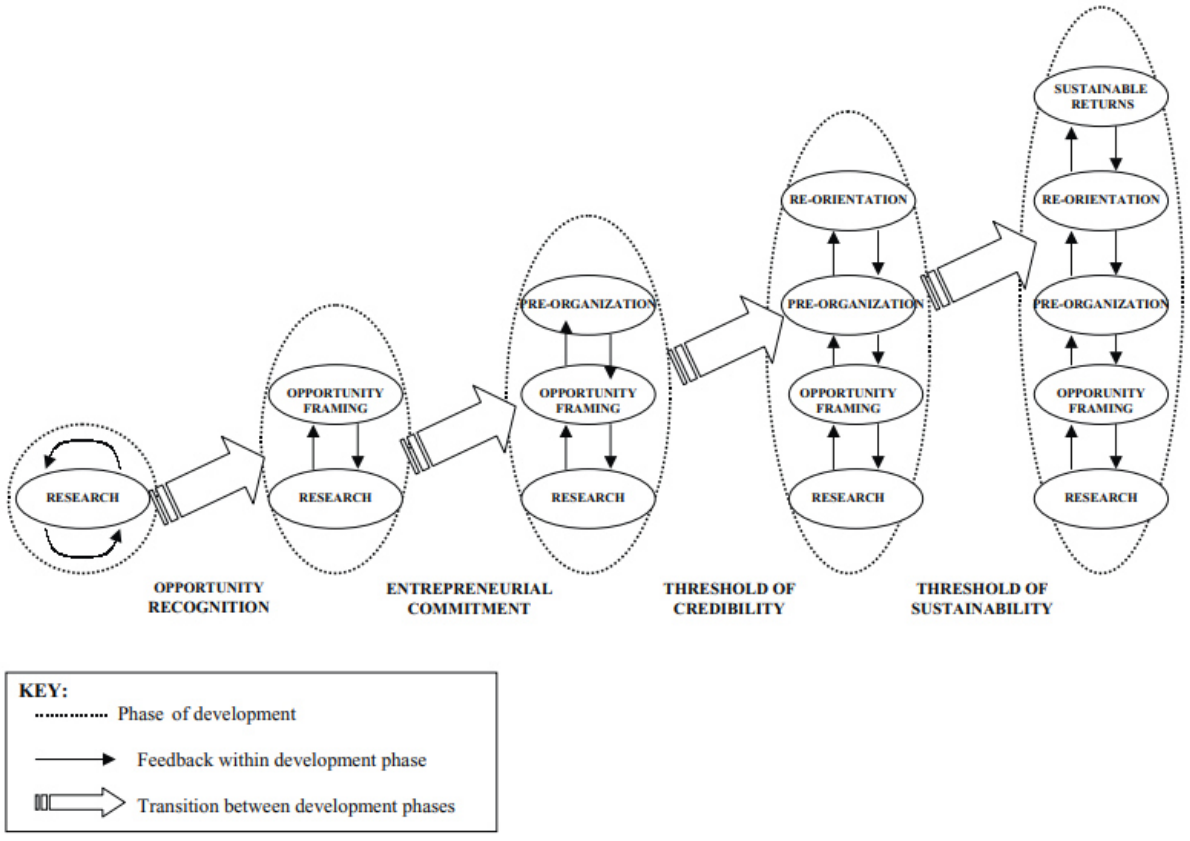


Figure 1: The critical junctures in the development of university spinout companies (Vohora et al., 2004, p. 142).

[1] Google Scholar citation number of 1,505 (https://scholar.google.com/scholar?cluster=2251611346992624762&hl=en&as_sdt=0,5&inst=5726176096060060532); Scopus citation number of 649 (https://www-scopus-com.ezproxy2.utwente.nl/authid/detail.uri?origin=resultslist&authorId=6506339359&zone=); ranked as category A journal by the VHB jourqual 3 ranking in the fields of TIE and entrepreneurship (https://vhbonline.org/vhb4you/vhb-jourqual/vhb-jourqual-3/gesamtliste) and with an h-index of the jounal of 255 (https://www.scimagojr.com/journalsearch.php?q=22900&tip=sid&clean=0).

It shows five consecutive phases in the development of a university spinout company. University spinout companies are more distinct than general student ventures as they are based on university research. According to Vohora et al. (2004) these ventures need to overcome the four hurdles 'opportunity recognition', 'entrepreneurial commitment', 'threshold of credibility', and 'threshold of sustainability' in order to be established and successful.

The framework is useful for the purpose of this research because it not only describes the early venture development process, including obstacles, but is also based on university spinout companies which are similar to student entrepreneurial ventures. Scholars have previously used this framework for analyzing entrepreneurial competencies (Rasmussen et al., 2011). In conclusion, it can be assumed that Vohora et al.'s framework is a good basis for this research. To answer the research questions, this research looks at the venture creation process and focuses on how student entrepreneurs overcome the first three critical junctures.

As shown in Figure 1 by Vohora et al. (2004), the venture development process starts with phase one, the 'research' phase. It entails the (scientific) research leading to the opportunity, which often arises from academic research and publication. The framework emphasizes the iterative nature of the phases where all activities are cumulative, i.e., they are continuously building on each other. The first critical juncture, 'opportunity recognition', shown under the first arrow from the left in Figure 1, is about connecting (scientific) knowledge with a commercialization opportunity, fulfilling an open market need. This juncture needs to be crossed to continue into the next phase, 'opportunity framing'. This phase is necessary to find out if there is enough value in the opportunity to pursue commercialization. Phase two entails answering questions like: Is there a market for the product/service and what might the route to market look like? The next critical juncture that needs to be crossed is 'entrepreneurial commitment', which can be described as the personal choice to develop the opportunity into an operational business. An entrepreneur enters a time-wise commitment and shows faith in the business opportunity. The last phase that this research illuminates is the third phase, 'pre-organization'. The pre-organization phase involves the implementation of strategic plans and decisions on which resources to develop and where to get these resources from. This phase is about developing enough credibility to attain the resources needed to start the business. This leads us to the 'threshold of credibility' which Vohora et al. describe as a "lack of credibility [that] constrains the entrepreneur's ability to access and acquire key resources: seed finance and human capital to form the entrepreneurial team." (2004, p. 164). Further, this critical junctures also encompasses the ability to acquire customers (Vohora et al., 2004).

Rasmussen et al. (2011) combine the definition by Vohora et al. (2004) with that of Lockett and Wright (2005) and state that the ventures under their investigation have overcome the threshold of credibility when an entrepreneurial team greater than the original inventor(s) is met by a private sector investment.

In case of this research, the ventures are defined to have gained credibility when they secured external equity investment. This money should, as defined by Lockett and Wright, come from "external parties to the universities: venture capitalists, business angels, industrial partners and university challenge funds." (Lockett & Wright, 2005, p. 1050). The reasoning here is that to create an operational business, finance is the most important lever, while the extension of the founding team is not necessarily a prerequisite if we e.g., talk about a software company. Of course, external funding needs to have a reasonable size in order to facilitate the ventures transformation.

It can be concluded that the venture creation process by Vohora et al. (2004) is useful to analyze the development of student businesses, which is underrepresented as pointed out before.

2.3. Entrepreneurial Competencies

According to some scholars, the competency perspective in the venture creation process, though complex and relatively unexplored, is useful for ascertaining how to support entrepreneurship (Hayton & Kelley, 2006; Rasmussen et al., 2011). In other words, research into entrepreneurial competencies might have significant implications for entrepreneurial education and support (Rasmussen et al., 2011).

To gain an understanding of entrepreneurial competencies, the recent systematic review of existing literature on the topic by Tittel and Terzidis (2020) is a good starting point. Their work is based on a previous version by Mitchelmore and Rowley in 2008, which Tittel and Terzidis updated and extended, yielding a state-of-the-art review of entrepreneurial competencies (Tittel & Terzidis, 2020).

First, Tittel and Terzidis consolidated several definitions of the term competence when they described it as "the disposition to generate adequate actions to responsibly solve problems invariable situations. This ability is based on knowledge, skills and attitudes." (Tittel & Terzidis, 2020, p. 19). They did the same with various definitions of entrepreneurial competencies as "the specific set of domain competences, social competences and personal competences needed to generate entrepreneurial action" (Tittel & Terzidis, 2020, p. 27).

In total, Tittel and Terzidis collected 32 articles that represent relevant entrepreneurial competency research. While these studies propose competencies necessary for venture creation, most of them are not suitable for the research of this study, because they cover different contexts of venture

creation. One of the studies in their list of papers, focusses on the entrepreneurial competencies necessary for university spinout company development, namely the work of Rasmussen et al. (2011). Rasmussen et al. (2011) built on the work of Hayton and Kelley (2006), who identified the entrepreneurial competencies necessary for corporate entrepreneurship, by refining these competencies using a longitudinal case study approach. The fact that Rasmussen et al.'s work is based on that of Hayton and Kelley (2006), which is part of the literature list consolidated by Tittel and Terzidis (2020), is further proof that Rasmussen et al. is relevant for the purposes of this research. Additionally, another paper co-written by Rasmussen is included on this list, making him a well-known scholar on the topic of entrepreneurial competencies.

The groundwork for the necessary entrepreneurial competencies used in this research is the paper by Rasmussen et al. (2011), which is based on the work of Hayton and Kelley (2006), who defined four roles, i.e. competencies, that need to be present for corporate entrepreneurship to emerge: innovating, brokering, championing, and sponsoring. Rasmussen et al. (2011) investigated how these entrepreneurial competencies were developed or acquired by academic founders in a university context and distinguished between the core competencies that can be developed by or are inherent in the founders and those that can be supplied from the outside (e.g., by investors). In their work they specifically focused on the initial phases of venture creation up to the threshold of credibility, using the framework by Vohora et al. (2004).

According to Rasmussen et al. (2011), a venture needs three entrepreneurial competencies to achieve credibility with investors and industry partners: Opportunity refinement, championing, and leveraging. Moreover, the authors stray away from the individual perspective and state that multiple people can provide these competencies necessary for the initial phases of venture development. As shown by Maidique (1980), sometimes one person provides all necessary competencies in a small organization, but especially when ventures grow larger, the contributions of several individuals are needed for successful entrepreneurship. Overall, many of the required competencies are not static and evolve in the process of venture creation. However, all are needed to overcome the credibility threshold (Rasmussen et al., 2011). Moreover, some competencies are needed throughout the whole process, while others are only needed for certain phases in the process of venture creation (Rasmussen et al., 2011).

Rasmussen et al. (2011) state that much is still lacking for universities to optimally instill the needed competencies for venture creation in their students. Therefore, the competency perspective is important for helping universities improve their entrepreneurial support structures. Even though the entrepreneurial competencies necessary for the early stages of venture creation have been identified,

they were identified for a different population – academic entrepreneurs – while this study focusses on student entrepreneurs.

Focusing on student entrepreneurs, this research aims to investigate the three necessary competencies for venture creation, which is summarized in the following sections according to Rasmussen et al.'s (2011) work.

2.3.1. Opportunity Refinement Competency

First, according to the authors (Rasmussen et al., 2011), the entrepreneurial competency 'opportunity refinement' is needed for successful venture creation. This competency entails the discovery of the opportunity itself as well as the development of the opportunity into a viable business concept. This development of an opportunity into a viable business concept includes identifying the market value as well as the commercial viability of the opportunity. Therefore, in a creative process and based on existing resources, the opportunity must be improved and adapted. This often includes several iterations of tailoring the idea to market needs.

Moreover, during opportunity refinement it becomes necessary to interact with customers and industry in order to collect their experiences and position the business concept relative to the competition. This competency is often supplied by founding members with industry experience who can make industry contacts and take over the interaction with them. The venture itself is thereby gaining recognition in the industry and obtaining external credibility. (Rasmussen et al., 2011)

2.3.2. Leveraging Competency

Further, Rasmussen et al. (2011) state that the 'leveraging competency' is necessary for sustaining the venture's development. This competency emphasizes the resources needed to build the venture and how these get acquired and combined. The resources for the venture's development can come from the university, industry partners, and/or hiring new team members that fill certain skill or experience gaps (Rasmussen et al., 2011). According to Hayton and Kelley (2006), business knowledge is often needed by the person(s) taking on this role so they can better decide what resources to invest.

As described by Rasmussen et al. (2011) the competency helps to increase the ventures credibility over time, which enables access to resources held by industry partners. Another building block of the leverage competency is the entrepreneurial experience of the team, which must be gained to successfully communicate with external investors. This usually happens within the university context before interacting with external partners. In general, the university can support the entrepreneurial team in this process because often several actors need to supply this competency, internal and external. (Rasmussen et al., 2011)

Overall, the leveraging competency is crucial to the development of the venture's credibility as well as the entrepreneurial experience of the founding team (Rasmussen et al., 2011). Moreover, this competency goes hand in hand with the championing competency, as persistence and commitment to the venture are needed for obtaining competitive resources (Hayton & Kelley, 2006).

2.3.3. Championing Competency

The last competency needed to overcome the threshold of credibility is the 'championing competency', which refers to the personal commitment of one or several actors to the venture's development. These actors need to identify with the venture and have the ability and willingness to persuade others to support it (Howell & Higgins, 1990; Rasmussen et al., 2011). Further, championing is enabled by informal networks and the vision that the champion creates based on the opportunity (Hayton & Kelley, 2006; Howell & Higgins, 1990).

Championing also includes taking a leadership role, which is as vital as the personal commitment to further the venture's development. It might be possible that this role is divided between several actors, as internal championing is not always sufficient when the firm matures. Often, initial champions are necessary in order to mobilize additional champions, such as resource providers or industry partners. These external stakeholders then take on a mentoring or supporting role, mostly in the later stages of venture development. In some cases, these external champions to the venture even take on the role of 'godfathers', which are described as "influential people in industry or other resource providers who make an additional effort to help the project." (Rasmussen et al., 2011, p. 1337). Overall, the demand for championing competency increases with the ventures complexity. (Rasmussen et al., 2011)

To summarize, the first research question is answered by a literature review, which reveals that in case of academic entrepreneurship the three competencies 'opportunity refinement', 'leveraging', and 'championing' are needed for new ventures to overcome the credibility threshold. However, it is unclear how these competencies influence the venture creation process in the case of student entrepreneurship. This study aims to help fill this knowledge gap by investigating the second research question: '*To what extent do the entrepreneurial competencies impact overcoming the threshold of credibility in a student venture?'.* Therefore, qualitative research, in the form of semi-structured interviews with student entrepreneurs, is conducted, as explained in the upcoming section.

3. Method

3.1. Research Design

As pointed out by Hayter et al. (2017) research on student entrepreneurship is best approached qualitatively to gain an understanding of the phenomenon. Furthermore, qualitative research is

applicable because it is especially useful in cases where different theories exist for different populations (Creswell, 2013). In this case, there is existing theory on the entrepreneurial competencies of academic but not student entrepreneurs. Consequently, qualitative research is suitable for further exploring competency development in student entrepreneurship.

For this research an inductive approach, a type of qualitative research, is suitable, because induction involves observing individual cases and repeatedly establishing generalizations (Hyde, 2000).

In this study, primary data is obtained by conducting semi-structured qualitative interviews. This method was chosen because this widely used technique enables a deeper understanding of the interviewees' viewpoints than is possible through a questionnaire or standardized interviews (DeJonckheere & Vaughn, 2019; Flick, 2009). It is also more suitable than unstructured interviews, which do not have an established order due to the venture development phases and different competencies needing to be captured altogether, which is difficult without predetermined questions (Wilson, 2014b). Moreover, semi-structured interviews are more suitable than standardized interviews because they allow for follow-up questions and probes, which can yield deeper insights into interviewees' experiences (DeJonckheere & Vaughn, 2019; Wilson, 2014a). Further, semi-structured interviews afford the flexibility to add questions spontaneously, which can uncover perspectives that the researcher did not think of when designing the study (Wilson, 2014a).

Nevertheless, semi-structured interviews have drawbacks. For example, the direct nature of such conversations may bias interviewees toward more socially acceptable responses, a phenomenon known as social desirability (Bergen & Labonté, 2020; Creswell, 2009). The influence of social desirability can be limited by disclosing the purpose of the research, describing the importance of the downsides in the early venture creation process as realistically as possible, and through data handling and anonymization procedures (Bergen & Labonté, 2020).

Another difficulty with semi-structured interviews is reaching the right depth. This is difficult because it requires researchers to consistently lead interviewees back when they stray from the observed topic (Flick, 2009). Additionally, the transcription and analysis of semi-structured interviews is very time consuming, which might limit the number of possible interviews (Cassell & Symon, 2004). Despite the drawbacks, this procedure design is most fitting to the research topic at hand. The scope of the research is based on Vohora et al. (2004) and limited to the early stages of venture creation up until the credibility threshold.

3.2. Selection

The participants for this study are selected through non-probability sampling, e.g., based on the judgement of the researcher. In non-probability sampling not all units of a popolation have a same

chance to be selected into the sample, which is a subset of the population (Wolf, 2017). To select the interviewees of this research, the non-probability sampling approach of purposive sampling is used. This sampling technique is also called judgemental sampling and it allows the researcher to select participants based on the added value they might provide for the purpose of the research (Singh & Masuku, 2013). A drawback of this sampling technique is that a researcher's own bias might come into play. This can largely be avoided by delineating the criteria for selecting the participants beforehand (Sharma, 2017).

According to Skute et al. (2019), there are three levels of analysis in university-industry collaborations: individual, organizational and institutional. Since the investigated environment is related, these levels might also be applied to student entrepreneurship. Following its delimitation, this research focusses on the individual level of entrepreneurship. The units of analysis, so in this case the interviewees are, similar to Rasmussen et al. "company founders and members of the entrepreneurial teams, selected board members, university managers, people involved in commercialization support, and other relevant individuals" (2011, p. 1323). In addition, student entrepreneurs whose start-ups have failed are as suitable for this study as successful student entrepreneurs, since their compentency gaps might illuminate further insights. These are also the criteria for the purposive sampling method.

While there is no clear guideline as to the number of participants needed for a qualitative study like this (Denzin & Lincoln, 1994; Guest et al., 2006; Sandelowski, 1995), it is very important that the interviewees are experienced enough in the topic to add legitimate value to the findings. Additionally, having too few respondents can result in data that is not comprehensive enough, while having too many respondents can inhibit a deep analysis of the findings (Graneheim et al., 2017). The time-consuming nature of the analysis might result in roughly ten or fewer interviews (Cassell & Symon, 2004). The most important criterion in selecting the quanitity of interviews is to reach the point of saturation, at which additional interviewees stop yielding new information (Edwards & Holland, 2013). Potential participants are found through relevant institutions in the Netherlands and Germany as well as through the professional network of the author. An example of a relevant institution is Novel-T, a non-profit ecosystem for entrepreneurship that was founded by the University of Twente, Saxion University of Applied Sciences, and regional governments in the Netherlands (About Us, n.d.). Since being close two universities and also located on the campus of the University of Twente, Novel-T is a hub for student entrepreneurship.

3.3. Measurement

To answer the second research question '*To what extent do the entrepreneurial competencies impact overcoming the threshold of credibility in a student venture?*' the interview guideline for semi-structured interviews, as seen in the

Appendix, was constructed. An interview guideline includes important topics that need to be addressed, while enabling enough flexibility to explore certain directions that could particularly enrich the research. To achieve this, the guideline includes probes, which help investigate answers that need further clarification or are particularly interesting. Follow-up questions can still be improvised at the interviewer's discretion (Cassell & Symon, 2004; Kallio et al., 2016).

Like Rasmussen et al. (2011) the first section of the guideline, section **A**, starts with determining the **venture's central properties**, such as the founders, employees, and products or services the venture intends to offer. Then, sections **B** and **C** of the guideline are derived from the theory section of this work. In section **B** of the guideline, a simplified version of the initial **venture creation process** as defined by Vohora et al. (2004) is presented to the interviewees. Additionally, the concept of credibility is explained to the interviewees, so they can understand which success milestone might have been the 'threshold of credibility' for them. This section is used to build an understanding of which phase of the venture creation process the interviewer wants to investigate. The interview's main section, section **C**, focuses on the three **competencies** and consists of five to six questions per competency aimed at determining to what degree each was present in the founding team or supplied from the outside. These questions are derived from Rasmussen et al.'s (2011) competency definitions. For each competency, questions regarding barriers, experiences of overcoming them, and support structures are investigated. These questions are included to illuminate the impact the presence or absence of the competencies had on the venture's development.

Like in Rasmussen et al. (2011), the word 'competencies' is never directly mentioned to the interviewees to prevent biasing them. Additionally, to enable a better understanding, the questions in sections B and C are formulated in clear, non-scientific language and enriched by examples (Jovchelovitch & Bauer, 2000; Kallio et al., 2016). To improve the quality of the data collection, one pilot interview is conducted with an interviewee from the sample in order to refine the interview guideline (Kallio et al., 2016).

3.4. Data Collection

In scope of this research ten interviews with student founders are conducted. In the sample, four interviewees are based in the Netherlands and six in Germany. The related ventures are in different stages of the venture creation process, where some are just in the process of being established while others are already shut down or were successfully sold.

The interview are conducted online through MS Teams, and, with the consent of the participants, are audio-recorded and transcribed. Online interviews are chosen over in-person interviews due to

increased convenience, which also increases the likelihood that interviewees can partake (Gruber et al., 2008). This is a sensible choice, as entrepreneurs in general are particularly time constrained.

Further, the interviewees are informed about the handling and anonymization of their data. Since the recruiting process is based on the researcher's network, the interviewees are most likely based in either the Netherlands or Germany and the conversation is conducted either in English or German, based on the interviewees' preferences.

3.5. Data Analyses

After conducting the interviews, the recordings are transcribed and the resulting transcripts anonymized with the use of pseudo names for the interviewees as well as randomized letters for the the companies. The transcripts are then uploaded to ATLAS.ti, a qualitative data analysis software, with which the interview transcripts are thematically coded and analyzed according to their underlying theories (Braun & Clarke, 2006; Lewis-Beck et al., 2004). Thematic analysis as a method helps to find "meaningful patterns" in the data (Braun & Clarke, 2012, p. 58). Thereby, giving sense to commonalities across the interviews that are meaningful for the research topic or research question at hand (Braun & Clarke, 2012).

The data is analyzed in a three-step process, described by Gioia et al. (2013). In the first step the raw data is analyzed and open codes are sorted by commonalities that appear across the interviews (Gioia et al., 2013). At this stage, the interviewees' exact words are still intact and the resulting codes are called 'first-order concepts' (Sjödin et al., 2020). The second step, resulting in 'second-order themes', consists of distilling the numerous first-order concepts into overarching labels that describe the emerging patterns (Gioia et al., 2013). Finally, the second-order themes are aggregated into dimensions that align with existing literature on the topic(s) (Sjödin et al., 2020). The results can then be presented as a visual data structure, which helps to answer the research questions (Braun & Clarke, 2012; Gioia et al., 2013).

4. Results

The purpose of this research was to find out out which competencies a (un-)successful student entrepreneur possesses in different stages of the venture creation. For this, the first research question *'Which entrepreneurial competencies do student entrepreneurs need for the new ventures to reach the credibility threshold?'* was investigated through a literature review. To answer the second research question, namely *'To what extent do the entrepreneurial competencies impact overcoming the threshold of credibility in a student venture?'*, ten semi-structured interviews with student entrepreneurs were conducted and analyzed according to the above-mentioned method. In addition,

to investigate to what extent the three main competencies were present in the interview cases and if they were inherent in the founding teams or externally supported, the research wanted to derive support needs and possibilities, particularly in the university incubator and accelerator context.

4.1. Central Properties

For each case the central properties of the venture were determined and consolidated in Table 1 and Table 2. These show the number of founders, where a change is indicated with an arrow and a new number of founding team members. Further, the number of the venture's employees and their funding or scholarship amount is stated. Also the roles of the founders, the start date of working on the venture, the industry it operates in, the product or service the venture offers and the respective renvenue streams are listed. The last row shows a status quo that describes if the venture was still running by the time the interview was conducted or if it was stopped or sold.

Overall, all ten ventures were run by teams of student entrepreneurs and none by single founders. The number of employees differed from zero to 35. In terms of financial resources, four of the ventures obtained a scholarship, and three ventures collected investor funding. One additional case got offerend a scholarship, but rejected it and in a further case investor funding was rejected. The industries, products and services as well as revenue models show a wide variety, ranging from AI-backed software solutions to physical food deliveries. By the time of the interview, seven of the ventures were still run by the original founding team. From the remaining three ventures, one was stopped by the founders, another one stopped and the pitch deck and name sold and the last one was split into a non-profit and a company, from which the company was sold and is run by the buyer now and the non-profit operates with the founders as advisors.

Table 1: Central properties.

	Interview A	Interview B	Interview C	Interview D	Interview E
Founders	6 --> 5	4 --> 4	2	2	4 --> 4
Employees	30-35	21	30 (18:12)	Only founders	Only founders
Funding/scholarship	Investor funding + scholarship = 250,000 €; additional bank loan of 250,000 €	Scholarship = 140,000 €; investor funding = 1st round = 200,000 € 2nd round = 450,000 €	1st round (angel investor) = 50,000 € 2nd round = 350,000 € Own money = 5,000-10,000 €	Got offered funding (15,000-20,000 €), but rejected it	Scholarship = 4,000 €/month
Roles	2 in venture A.1 (still needs to be defined, after recent restructuring process) and 3 in venture A.2 (sales, operations, operations) --> divided according to motivation "who actually enjoyed doing what"	Business lead, data science lead, two engineers	business, product and tech	Do all together	"we don't have clear titles. We grow into our roles and the longer we work on it, the clearer it gets"
Timeframe	December 2019	2020	2017; founded in January 2018	July 2021 until August 2022	May 2021
Industry	logistics and food trade, retail	real estate and energy services	CSR, social, corporate social responsibility, corporate volunteering	Food & beverages	Software and AI + B2B energy generation
Product/service	A.1: Online store for regional organic food, delivered with cargo bikes. A.2: Rental of cargo bikes with driver as a service.	Software solution to optimize energy systems in buildings	An online marketplace for volunteering (app and web versions)	Cold brew coffee subscription service	Producing and selling hydrogen for wind & solar parks when they produce too much energy to store it (and predict beforehand when it will occur with the help of AI).
Revenue streams	A.1: Sale of the food A.2: offering the service	Goal: Software as a Service or recurring revenue; today: Mix of one time and recurring revenue	Licensing to the corporates, Software as a Service	Subscription service; also had just sales through our website and on specific locations on campus.	A margin from the sale of the hydrogen
Status quo	Running	Running	Split into a company and a non-profit. Company was sold.	Stopped.	Running

Table 2: Central properties (continued).

	Interview F	Interview G	Interview H	Interview I	Interview J
Founders	2	1 --> 2	2	1 --> 2	3 --> 4
Employees	6-7 "We currently have an intern taking care of marketing and the community building. We have the AI developer, and we also have a research team that helps us creating the neuroscientific survey"	1 and interns	Only founders	2 Digital marketing and front-end developer	Only founders
Funding/scholarship	Prize money = 2,500 € Own money (no amount named)	Revenue from one customer of the old proposition/business model Own money (small amount)	/	Scholarship = 120,000 €	Got offered scholarship (= 75,000 €), which they rejected.
Roles	No clear roles, one founder rather marketing, PR, human resources the other rather finance and logistics.	One does business development,the other one with a background in electrical engineering does the programming and other technical tasks.	CEO with entrepreneurial experiene and COO with structure	Programming and business	Logistics, IT, product, marketing
Timeframe	March 2022	November 2020	April 2022	March 2021	March 2020
Industry	Management consulting, software	Healthcare	Service / (eHealth)	Beauty, tech, cosmetics, AI	Micro fulfillment, logistics, unpackaged food.
Product/service	Management consulting tool that helps companies to objectively assign employees to project teams based on their unique profile and the chemistry between members (with the help of neuroscience and AI).	Application that uses movement sensors to motivate people to move more.	Pay-per-workout	AI analyzing the skin through pictures & giving cosmetic product recommendations.	Cargo bike delivery of raw, unpackaged foods.
Revenue streams	Subscriptions for companies per employee	No concrete revenue streams planned yet with the new proposition.	Sale of daily tickets	B2C commission	Sale of the food
Status quo	Running	Running	Running	Running	Sold (the pitch deck, brand name, etc.)

4.2. Coding structure

Overall, the resulting second and third order concepts were in line with the structure of this research as they show the ventures central properties, the three entrepreneurial competencies, different problems and barriers the respective ventures faced as well as support they either received or missed. Additionally, a few codes were without further code group such as for example the credibility (threshold). The structure of the **code tree** is depicted in Figure 2.

Figure 2: Code tree.

4.3. Entrepreneurial Competencies

The previously identified three entrepreneurial competencies were present in each of the ventures under investigation. The degree to which each competency was present differed for the ventures as well as if they were inherent in the founding team or supplied by the outside.

As stated by Tittel and Terzidis a competency "is based on knowledge, skills and attitudes." (2020, p. 19). In line with that definition, a competency is the combination of multiple factors. This was taken into account in constructing the interview guide, breaking down each competency into 5-6 questions. Also through the coding procedure different factors constructing each competency emerged as first-order concepts.

Related to the definitions of Rasmussen et al. (2011), the **opportunity refinement competency** could be identified the interviewees desciptions of the following factors: The 'opportunity recognition' and the development of the 'business concept'. To refine the business concept also degree of 'market-related knowledge' and the execution of 'customer/industry research' was relevant.

In contrast, the **championing competency** was composed of the founding teams 'personal commitment' to the venture as well as their 'financial commitment' and 'time-wise commitment'. Further, the 'passion/motivation' and 'vision' of team members as well as external parties indicated the presence of the championing competency. Also, mentioning a typical 'champion' or 'leadership' through a certain actor was identified as an indicator for this competency.

For the **leveraging competency** the degree of 'business-related knowledge' and 'entrepreneurial experience' was defined as relevant. Additionally, the desciption of how 'resource acquisition' happened for the venture served as an indicator for the degree of the competencies presence in the cases.

4.4. Credibility Threshold

As previously defined, in case of this research, the ventures are defined to have gained credibility when they secured external equity investment. This investment can come from "external parties to the universities: venture capitalists, business angels, industrial partners and university challenge funds." (Lockett & Wright, 2005, p. 1050). Of course, external funding needs to have a reasonable size in order to facilitate the ventures transformation.

Looking at a specific case, venture F obtained 2,500 € in prize money from a university challenge, which can be defined as 'university challenge funds', but they have not secured any further investment and are so early-stage that they do not have a software pilot in place. Therefore, it can be deducted, that they have not crossed the credibility threshold yet.

Overall, four out of the ten ventures in this research can be stated as to have overcome the threshold of credibility, as they obtained external equity investment (offers). In one of the cases, namely venture D, the investment was rejected, and the venture stopped, as the founders decided that they do not want to continue working on it. Although it needs to be stated that all ventures have obtained some form of credibility to date, whether it be by scholarships, first customers, being part of an incubator or accelerator program.

4.5. Individual Cases

In the following, the story of each individual case is illustrated with an emphasis on the three main competencies. These include the most relevant problems and support structures for the venture's development, culminating in an assessment if the threshold of credibility was overcome or not.

Venture A

Opportunity Refinement: The idea for Venture A.1 emerged from an established company in the industry. In the beginning it was a 20-person team working on the idea, until only the founding team of six study colleagues remained. Due to the availability of resources and market demand, Venture A.2 was established complementary to Venture A.1, and has since surpassed Venture A.1 in terms of revenue. Throughout the development of both ventures, the founders received industry expertise, network and funding from the industry partner, that the idea emerged from. They received no assistance from universities, and did not part take in incubator or accelerator programmes.

"Basically the idea came from external. And has been floating around for a while, at [Company Z] and that is, it was sort of identified by them and then communicated to us, so to speak. And then we more or less worked it out together."

Championing: The founding team commited different amounts of time to the project and left the possibility open to opt-out of the project at any time. At the beginning, only the industry partner/investor who came up with the idea was fully committed. After a period of time, the founding team collectively decided to increase their level of commitment, as shown by their pursuit of an external bank loan. Throughout the project, the team members supported each other, even during challenging periods. The industry partner, which can be seen as a 'godfather' to the venture played a significant role in its development.

"We have really decided to do this now […] and now also applied for a lot of money."

Leveraging: The industry partner who came up with the business idea provided initial funding, networking opportunities, and industry knowledge. In addition to these resources, the venture secured additional funds through crowdfunding, a scholarship, loans from parents, and a bank. The

founders, who all possess business degrees, had little entrepreneurial experience and were provided with resources, but limited advice. This resulted in the hiring of a substantial number of employees during the Covid-19 pandemic, followed by the need to let them go due to miscalculations. The founders recognize their lack of business experience and leadership skills as an area for improvement moving forward.

“It was really only possible to do it through [Company Z] and also with the impulse, because they were really keen on it […] we'll provide you with the financial means to implement it.”

Credibility Threshold: Yes, recieved total funding of 250,000 €.

Venture B

Opportunity Refinement: The idea came from a industry research project, that identified a need for a software solution to the investigated problem. The business opportunity was then adapted and refined multiple times, with the help of a diverse range of stakeholders as well as previous market and industry knowledge of the founding team. The biggest obstacle was the conservative customer base the business concept aimed to address.

"It was really this problem of the research project that there was no solution, no software solution, […] that's why it was quite obvious that this will be kind of a problem in the future and that it's kind of necessary to make something out of the research results."

Championing: The ‘Godfather’, who initially served as a business angel, strongly believed in the venture and eventually became employed full-time. Additionally, another external champion played a significant role in pushing the development of the venture forward. For the team, their commitment to the venture intensified with the founding of the legal company, as they took on increased responsibility with the hiring of employees. This commitment was further strengthened when one of the founders left, leading to a deeper commitment from the remaining team members.

“We hired one super experienced guy who […] kind of helped us. I would say […] we didn't really pay a lot, but he really believed in our product and helped us a lot to kind of build up an organization.”

Leveraging: The team leveraged a significant number of existing contacts and engaged in extensive networking efforts to advance their venture. The initial scholarship provided the time and resources necessary to refine the business concept, and the team's credibility was established through their affiliation with the university and legitimacy through stemming from a research project with well-known industry players. The venture’s journey developed from university internal funding (scholarship) to multiple external funding rounds (business angels and venture capital). The university

environment facilitated easier access to human resources, while the team's university and industry credibility facilitated easier access to financial capital. A leadership role was filled by an individual with extensive entrepreneurial experience that was hired by the founding team.

“We came out of this kind of research project where, like quite innovative and established partners were part of it. And also the two founders of us used to work for those companies for a couple of years. So that was that was or is quite important as a credibility for customers and also investors.”

Credibility Threshold: Yes, recieved total investor funding of 640,000 €.

Venture C

Opportunity Refinement: One founder was experiencing the problem first-hand, had the idea and then got the second founder on board. They refined the business concept together, mostly based on industry research as they could not hold much industry experience themselves. While refining the opportunity they encountered some problems with the business concept and their idea, which they eventually managed to solve.

"But it was also very, like being very persistent in sales and tweaking the product and trying to and speaking to more customers."

Championing: The two friends were fully committed to developing the business opportunity before the demand for it was fully clear. They made a full-time commitment, stopping their studies and invested their own financial resources, while also accepting external funding and taking on the associated responsibility. The venture's development was driven forward by investors who emphasized the need for revenue generation. Over time, their time-wise commitment diminished as they decided to put more emphasis on their studies.

“We basically committed and then made market research whether there is a thing, but we're like head through the wall kind of already committed. And we we decided that we'll find something. […] And in the end, we were lucky. But it could have also happened that there is no market opportunity, so it's kind of risky.”

Leveraging: The venture faced a challenging start, with limited network access due to the young age of the founders. However, their prior entrepreneurial experience helped overcome some of these obstacles. The hiring of a technical expert brought in missing knowledge and further experience. The venture’s team managed to become part of an accelerator program that provided office space, mentoring, and networking opportunities, although the founders were not affiliated with the university. The key challenges faced by the venture included securing adequate human resources and

funding, but the founders demonstrated persistence in overcoming these hurdles. An angel investor eventually provided support, bringing valuable entrepreneurial experience and network connections. The venture achieved a second successful funding round and eventually sold a portion of the company, while transforming the remaining half into a non-profit organization.

“We found kind of this online offering from the [UNIVERSITY T] that they were offering kind of this accelerator program where we get office space a half a year for free. […] And even though we didn't have any other affiliation to the university, none of us. And we kind of talked our way into the program.”

Credibility Threshold: Yes, recieved roughly 400,000 € of investor funding.

Venture D

Opportunity Refinement: Two study colleagues identified a product and were motivated to introduce it to their network. They adapted the business approach several times as a result of the acquisition of industry knowledge through trial-and-error processes and exchange with external parties. However, the lack of industry and market knowledge as well as experience resulted in challenges in evaluating external opinions. Their speed of adaptation stemmed from their understanding of entrepreneurial effectuation, which they learned at university.

"Then we googled a bit how it's made and we say, okay, this is super easy to make and we don't know it. All our friends don't know it, so we should just sell it"

Championing: In the beginning, the time-wise and personal commitment to the venture increased steadily, as the main motive was to use it as a learning opportunity. Eventually, the company was legally founded and they mainly saw the venture as a learning experience. Over time, the level of excitement and commitment to the business declined, the venture team declined a funding opportunity and ultimately decided to terminate it.

“We had good revenue streams coming in at that point, and the next step would have acquired a lot of time and effort, which we just right now in our career didn't want to focus.”

Leveraging: The venture was part of a university accelerator and received coaching through an entrepreneurial honors program. Despite lacking practical entrepreneurial experience, the founders had a strong foundation in entrepreneurial education. They were offered funding through a student investment fund due to their personal network, but opted to bootstrap the venture with a small personal investment instead. The venture was able to access resources through an industry partner and acquired additional industry knowledge through other contacts. However, when both founders

wanted to exit the venture, they were unable to find a suitable CEO to take over, leading to its eventual termination.

“About 15,000 to 20,000 €. And the reason we rejected it was that at that time, we didn't really know what we would have used it for, and it felt like a commitment that was unnecessary at that point in time because we were doing very well, bootstrapping it.”

Credibility Threshold: Yes, they reached credibility by obtaining first customers and getting offered funding, but rejected it and terminated the venture.

Venture E

Opportunity Refinement: The initiation of the venture was triggered by one founder encountering a business opportunity at their workplace that their employer did not want to pursue. It took the involvement of two friends and participation in a business idea competition to set the process in motion, with the founder moving quickly to refine the idea. All members of the team had prior industry experience, which was leveraged to refine the opportunity and deepen the concept through participation in multiple business plan competitions.

"The original business concept was me, [Ryan] and [Peter]. And then the business concept changed again when we got [Sofia] and [Bernard] on board, basically, because they were more realistic about what we can achieve with data and what machine learning can do and can't do. So they basically fine-tuned it."

Championing: The team experienced significant changes in its composition, commitment, and motives throughout the venture's development. Initially, the motivation was financial, but later the teams time-wise commitment was reinforced when obtaining a scholarship. One person dropped out, due to lacking commitment to the venture, while the personal commitment of the two founders taking on business roles increased over time. In general, securing the commitment of the software-side team members who were less engaged with the purpose of the venture emerged to be a problem. The venture's development was pushed forward by participation in an accelerator program and support from a professor. Due to its alignment with a market trend, the venture's network and external support increased naturally.

“Like [Ryan] and my commitment really, really grows by the day, grows with every customer we talk to, with everyone that says, this is fantastic, let’s collaborate, let's do something. Yeah, from both of them [the two software-side founders], I didn't really see a change over time.”

Leveraging: The foundation for the business was established through participation in a university incubator and further legitimacy was achieved through a stipend and successful participation in a business idea competition. The team possessed complementary prior business and industry experience, as well as some entrepreneurial experience. Building a network was facilitated through the support structures provided by the incubator and took on a dynamic of its own, driven by the business idea's relevance to pressing societal issues. The next step is a bigger scholarship, as the venture is too early-stage for external funding, as they do not have a software pilot yet. Overall, they find it challenging to establish legitimacy within the industry and fear a future lack of resources to hire machine learning or data science specialists.

"Especially with the whole gas crisis, people come to us like we don't even need to reach out to people that want to help us. People really come to us and we get nominated for prizes and stuff."

Credibility Threshold: No, as the venture still is too early-stage for external funding. They are currently financed through a scholarship, which is an indicator for internal credibility in the unversity context.

Venture F

Opportunity Refinement: Two individuals who were classmates engaged in a discussion about their respective professional experiences, and during the conversation, they identified a problem and collectively developed a concept to address it. Despite receiving external support in validating their idea, the opportunity they started with remained unchanged.

"Both of us having brainstorming meetings for hours, putting our or sharing our input to shaping, shaping all the time. It was a common work."

Championing: The two co-founders demonstrated high levels of commitment and motivation from the start. Over time, their level of commitment increased as they acquired their first customers and established the legal entity for the company. Despite being time-constrained due to ongoing studies, the founders did not depict this as an obstacle to the venture's progress. The support of an accelerator and its accompanying coaching played a significant role in pushing its development forward.

"I think it changed us during the milestones because after you finish each milestone, you have results that you are really proud of and motivate you to keep pushing more and more."

Leveraging: The two founders of the venture have business knowledge and experience, possess complementary skills and have received entrepreneurial education, while lacking entrepreneurial experience. They were able to access resources, knowledge, and networks through a university accelerator. The missing skills and workload were addressed by hiring interns and a university research

team. The legitimacy and visibility of the venture were established through its success in university competitions, positive voter feedback, and exposure on events. The company has already secured international customers, but the outlook for obtaining funding may be challenging in the Netherlands as the company is officially registered in Romania.

"[University Accelerator Y]s community, that was our only help. And it was a huge help. Yeah, because those are specialized people or coaches that can just make remarks and put the right questions so we can understand by ourselves where something was missing or if it was missing. So that was the only help. And yeah. Other than that, we didn't need anything more."

Credibility Threshold: No, no funding obtained yet, but the venture is pretty early-stage, as they are just working on their pilot. They already recieved a lot of credibility in the university context and have first industry customers on board for testing their pilot.

Venture G

Opportunity Refinement: The founder of the venture designed a product in the context of a university course. The initial attempt to develop a business concept was not successful due lacking product-market fit. The lack of viability of the business concept was due to both missing business knowledge and industry knowledge, that was not also not supplied externally. The participation in a market readiness program lead to interaction with the industry, and facilitated the redesign of the product and a new market approach.

"My main issue or problem was that I was stuck in thinking 'you solve your solving something for someone', but that problem was not worth solving. And finding that out. I think that was, for me, the main struggling point."

Championing: The start of the venture was driven by the founder's job loss and persistence of the business idea from their studies. The founder showed some level of championing competency, as they managed to convince a friend to join the venture team and secure a customer to finance the product development. However, there were challenges in convincing people and the feeling of not deserving the support. Additionally, the founding team did not want to financially commit themselves by investing own money into the venture and over time a decrease in time-wise commitment occured. External champions provided some support.

"I was never at a point that I felt comfortable to put in a lot of money myself. So for me, myself, I didn't really feel that we were at a level that we deserved more support."

Leveraging: The start of the venture was marked by a successful leveraging activity, with the co-founder being convinced to join the venture. The founders continued to actively participate in university accelerator programs and start-up competitions, as well as venture development initiatives from a regional development agency. The financial resources for the development of the first business proposition were obtained through finding a customer and generating revenue, and further missing skills were covered through hiring someone from the network. As similarly described by Rasmussen et al. (2011), the venture lacked business knowledge and was uncertain on how to allocate resources effectively. The abundance of human resources available in the university environment was leveraged through talks at relevant student associations, resulting in the acquisition of interns and increased visibility. The venture had gained industry contacts, but was still missing the right contacts in the venture's industry. A creative solution was employed by hosting a podcast with industry players in a related topic.

"You could throw a lot of money at it, but you can also just get into contact with students associations or I think there is a lot of resources in a university like people-wise, employee-wise. Yeah. And finding the tap into that resources is the, I think, the key."

Credibility Threshold: No, founder state themselves, that they do not have credibility on the market yet. With their first business concept, they never overcame the threshold of credibility, which is why they iteratively went back to the beginning to build the venture around a new business proposition.

Venture H

Opportunity Refinement: Two friends who were passionate about sports and identified a business opportunity in that area. Through their shared interest and one founder's extensive entrepreneurial experience, they jointly developed and shaped the idea, conducting industry research and adapting their business model several times.

"We said, what is the exact problem we encountered in the gym? […] So, okay, let's do something in this area and then we identified these problems."

Championing: One of the founders had previous entrepreneurial experience from previous start ups and played a central role in leading the venture, representing it externally in the beginning. Both founders were fully committed to the venture, personally, time-wise and financially, and had a large network of support, including a university professor who served as an external champion.

"In the beginning I decided many things because I had a background in that. But right now we can discuss everything."

Leveraging: The two founders of the venture have differing levels of entrepreneurial experience, with one having a history of founding two start-ups and the other having no prior entrepreneurial experience. However, both have received some degree of entrepreneurial education. They are participating in a university accelerator program, where they receive coaching from experienced entrepreneurs. Further, they have established a network that includes relevant industry contacts and external champions.

"If you are able to get assigned an earned coach, it means that you were able to convince a really big entrepreneur of your idea."

Credibility Threshold: No, no funding yet, as stated by the founders this is due to the fact that they are too early-stage and do not have a pilot in place yet.

Venture I

Opportunity Refinement: A student spotted an opportunity to receive a scholarship for a business idea, which led them to search for a market gap, which was eventually discovered. Due to a lack of industry and business knowledge, the entrepreneurial team relied heavily on the guidance of the university incubator. That guidance led the team to conduct industry research and experiment with different business model approaches as part of their incubation process.

"We are in the validation phase apparently and whatever that means, it means, I guess, that we have to talk to customers and potential people in the industry and find out whether the business model, the concept we have, it actually works."

Championing: The founding team of this venture comprises of individuals with varying levels of commitment. The first founder has made a full-time commitment to the venture, prioritizing it over their studies. The other members of the team, who work as much as they need to fulfill their scholarship requirements, have not committed to the venture at the same degree. The absence of a clear leadership among the founding team has resulted in the venture being completely steered by the incubator, which provides the necessary guidance and support. Simultaneously the first founder lacks long-term motivation to pursue the business opportunity, but rather aims at obtaining scholarship money for the upcoming months.

"She's going to do the threshold thing for it to work. But she's not going to like sleep in the office because I sleep in the office like twice a week or so. And the other two, they're obliged by the scholarship to do 32 hours."

Leveraging: The founder of the venture lacks both entrepreneurial experience and business-related knowledge, leading to difficulties in prioritizing tasks and determining which resources to invest in. However, they overcame some obstacles by finding co-founders with entrepreneurial experience and consulting external advisors. The university has played a significant role in the development of the venture, serving as the main source of knowledge, office space, and financial resources through scholarships. The founder has also leveraged resources by applying for incubator programs and different scholarships. Despite these efforts, the venture has yet to secure funding and venture development is influenced by the short time horizon the main founder is oriented at.

"Mainly it's the university which is listening to what the university gives us. We get university get money from the university. We get the knowledge that the university provides us with the workshops and we listen to what the university says basically. And the university told us to do market research. That's why we're doing it."

Credibility Threshold: No, as the venture is currently financed through a scholarship, which is an indicator for internal credibility in the unversity context. They are aiming for a bigger scholarship next. They state themselves, that they were not able to secure funding, because they do not have an MVP on the market yet.

Venture J

Opportunity Refinement: The business opportunity arose in a group of friends and study colleagues, who discussed and shaped an initial idea into a business concept. The founders, who were part of the services target group, possessed some initial industry knowledge which was complemented by knowledge from industry partners and the university to refine the opportunity. It emerged that obtaining a positive business case in the future would be an obstacle, but the founders sold the name and idea before reaching that point.

"Her initial idea was to get unpackaged goods delivered. That was her initial idea. And then we kept on [..] thinking together how to realize that."

Championing: The venture development was driven by the founding teams intrinsic motivation for a good cause. Who acted as main driver for the venture's development fluctuated among the members. The team was comprised of two highly committed individuals with an outward-facing role and another playing a more behind-the-scenes role. Eventually, a new team member joined and overtook everyone's commitment, taking on a leadership role, as their lack of employment allowed them to be fully dedicated to the project. This aligns with the concept that "slack resources allow key persons to focus their effort on the spin-off project" as described by Rasmussen et al. (2011, p. 1337). Despite

receiving a lot of support from various sources including the university, family, friends, and industry contacts, the team ultimately decided to sell the idea and pursue more secure employment instead of committing to an offered scholarship.

"We sold it actually, because it was like we had to decide whether we go into jobs, into save jobs or we take the risk. And we chose the safe jobs in the beginning because we needed to get some experience and just get a safe harbor."

Leveraging: The founding team of the venture consisted of individuals with complementary skills, acquired through their studies and industry as well as business experience. One of the founders possessed some degree of entrepreneurial experience. The remaining gaps in expertise were covered through support from external advisors and university professors. The team also relied on a large network, which proved to be a valuable asset in their venture development. The founders acquired a significant amount of knowledge through self-education, and leveraging of diverse resources such as a business plan template from the German government. They were able to secure office space through diverse industry contacts and received operational support from further industry contacts. Despite receiving a scholarship offer, the team chose to reject it and eventually sold the copyrights to an individual who approached them actively.

"We just relied on our network. And yeah, mostly from our group because yeah, I think we all have pretty good networks or helpful networks for the occasion of founding a start-up."

Credibility Threshold: No. They obtained somewhat of credibility by getting offered a scholarship, which they rejected, and being able to sell the copyrights, pitch deck, etc. of the venture.

4.6. Trajectories

Conducting a cross-case comparison of the ten student ventures, the following section derives common development paths of the ventures. It is based on the three entrepreneurial competencies as well as the venture's problems and support structures, leading to the outcome, which is the threshold of credibility. Overall, four trajectories i.e., venture development paths were deducted which are elaborated on in this section.

Trajectory 1 – Possessing all competencies to some degree, developing, and acquiring the missing components over time, which leads to credibility on the market and external equity funding.

Venture A: In the beginning the founding team was lacking all competencies to some degree, as the business idea and market-related knowledge came from external (opportunity refinement), they did not fully commit personally or timewise to the venture (championing) and were also lacking business and entrepreneurial experience (leveraging). Still, they managed to overcome the threshold of

credibility, because the initiator of the idea, which can be characterized as 'godfather' provided funding, industry knowledge and a network, until they decided that they want to re-commit to the venture and take on more responsibility.

"It was really only possible to do it through [Company Z] and also with the impulse, because they were really keen on it, so to speak, and said okay, we'll provide you with the financial means to implement it."

Venture B: The perfect path as described by Rasmussen et al. (2011), from internal to external credibility, including an external champion pushing the venture's development forward. They encountered some obstacles in the opportunity refinement, due to their target market, but apart from that they proved to have a high degree in championing and leveraging competency.

"We came out of this kind of research project where, like quite innovative and established partners were part of it. And also the two founders of us used to work for those companies for a couple of years. So that was that was or is quite important as a credibility for customers and also investors then."

Venture C: Due to the young age of the founders and their limited network and knowledge, they faced numerous obstacles. Yet, they managed to overcome them by developing the necessary competencies and gradually obtaining viable resources and network over time. Eventually, they crossed the threshold of credibility, had multiple successful funding rounds and finally sold part of the venture.

"It's more being able to dive into anything and learn everything and make sense of uncertainty in a way and be bullish and decide in the uncertain what to do."

Proposition 1: Student ventures that possess the opportunity refinement, championing and leveraging competencies to some degree at the beginning and are able to internally or externally acquire them over time, cross the threshold of credibility.

Trajectory 2 – Possessing all necessary competencies to some degree or were able to develop and acquire them, but they are too early-stage to tell if they will overcome the threshold of credibility.

Venture E: Promising start of the venture but too early-stage for crossing the credibility threshold yet. Overall, they proved to have a high degree of opportunity refinement competency, and a sufficient base to develop or externally supplement their championing and leveraging competencies. A possible barrier for crossing the threshold of credibility might be the high costs of the technical personnel necessary to further develop the product, which depends on obtaining private equity funding. Overall, they are on a promising path, because of the high market demand for their business idea.

"Especially with the whole gas crisis, people come to us like we don't even need to reach out to people that want to help us. People really come to us and we get nominated for prizes and stuff."

Venture F: Promising start of the venture but too early-stage for crossing the credibility threshold, as they do not have a prototype in place yet. They show sufficient degree of opportunity refinement as well as championing competency and developed them over time. The lacking entrepreneurial experience, as part of the leveraging competency, is externally supplied by a university accelerator. Overall, they are on a promising path towards crossing the threshold of credibility because they have already acquired some multinational customers.

"The final proof of credibility is from the early adopters that we are currently working with. The companies that are medium and large and willing to test our prototype. We already have three on board."

Venture H: Promising start of the venture but too early-stage for crossing the credibility threshold, as they have no pilot in place yet. Entrepreneurial experience, industry contacts and participation in (university) accelerator pave the way, while the founding team shows sufficient degree and ability to develop or acquire all three competencies. Overall, they are on a promising path towards crossing the threshold of credibility because they are not lacking any support, and are only missing a pilot in order to begin the search for private equity funding.

"I wouldn't have wished for additional support because we had quiet some external support."

"Finding investors is quite hard if you have not much done yet. So, if you haven't had a pilot, for example, we are working on it and we start from next month on."

Venture I: The founding team is lacking the necessary competencies to some degree and shows varying levels of personal as well as time-wise commitment to the venture. The university incubator steers its development while providing everything the venture needs in the short term. The venture is too early-stage to have received private equity funding yet. Now, they aim for a greater scholarship, which would indicate a university internal credibility.

"Mainly it's the university which is listening to what the university gives us. We get money from the university. We get the knowledge that the university provides us with the workshops and we listen to what the university says basically. And the university told us to do market research. That's why we're doing it."

Proposition 2: Early-stage student ventures, that possess all necessary competencies to some degree or were able to develop or acquire them, are more likely to cross the credibility threshold in stable market conditions, than ventures in less stable market conditions.

Trajectory 3 – Ventures that lacked the necessary competencies and did not manage to develop or externally acquire them, resulted in them not being able to cross the threshold of credibility.

Venture G: Lacking especially the opportunity refinement and to some degree the championing competency is combined with a high degree of leveraging competency. The absence of a 'godfather' or further influential external champions led the venture to initially fail at crossing the credibility threshold. Now the venture team tries it again with increased competencies and a new business proposition for their product.

"You should gather evidence first instead of just building a product. It's still so tempting to just build the product. Certainly for a designer. So that was my main struggle in the beginning to be critical. How much support do you really have for the problem we are solving."

Proposition 3: Student ventures that lack one or more of the necessary entrepreneurial competencies and not manage to develop or externally acquire these, cannot cross the threshold of credibility.

Trajectory 4 – Ventures either crossed the threshold of credibility or were on a promising road towards it but terminated the venture due to a lack in commitment, i.e., a lack in championing competency that could not be supplied externally.

Venture D: Founders with an elaborate background on entrepreneurial education and the skills to acquire and leverage the necessary competencies crossed the credibility threshold but decided not to take the offered funding and terminate the venture. Their main motive, learning how to build a venture, did not result in a sustainable commitment to the venture itself and can be seen as a lack in championing competency that could not be overcome.

"When the commitment was lacking and we should have spent more time on it and we didn't, which was also for sure a reason why we stopped in the end and why it didn't grow even further than it did."

Venture J: Founders with a good, complementary skillset were on a promising road towards reaching credibility, but it did not come to that as they terminated the venture before. The reason was that it did not provide enough security and they were not committed enough, which can be interpreted as a lack in an important component of the championing competency. The outlook of the difficulty in obtaining a positive business case in a very competitive industry may have influenced the decision as well.

"We sold it actually, because it was like we had to decide whether we go into jobs, into save jobs or we take the risk. And we chose the safe jobs in the beginning because we needed to get some experience and just get a safe harbour."

Proposition 4: A lack in the founding team's commitment to their venture (a component of the championing competency) cannot be supplied externally, and the venture cannot be developed into a credible or sustainable venture.

5. Discussion and Conclusion

The final chapter of this thesis starts with gathering the main findings of the thesis, then it delineates the theoretical contribution and limitations of this research and illuminates future research avenues. Further, the practical contribution of the thesis is highlighted and the chapter is closed with the conclusion.

5.1. Key Findings

This section gives an insight into the problems the interviewees described with developing their ventures, then it summarizes the support structures the founders talked about, and it closes by answering the two research questions.

5.1.1. Problems/Barriers

The examined problems and barriers in the venture development as described by the interviewees were summarized according to the second order concepts as shown in Figure 2.

The most evident problem the student entrepreneurs mentioned, namely in nine out of ten cases, was related to a **'liability of newness'.** The 'liability of newness' is primarily a challenge associated with being new to the market and lacking the institutionalized norms, routines, and relationships that established firms have developed over time. There are two components to it, on the on side the internal processes, knowledge and structures, on the other side the external legitimacy, relationships and trust with stakeholders, and others (Burgelman, 1991; Kale & Arditi, 1998). In this research 'liability of newness' is composed of several first-order concepts.
The first is related to **customers and the supply chain**. In the interviews this is described by difficulties in gaining trust from customers and missing knowledge in evaluating which actors might be good business partners for supply chain purposes. This can be illustrated by founder B stating, *"the most critical part in the beginning was like, our customers are B2B conservative, most conservative customers that you could imagine and that we get trust from them, get pilots etc. was the most critical part I would say."*

Further, 'liability of newness' is related to **legitimacy** on the market. In this research multiple problems occurred, which can be solved by growing as a venture and becoming an established force on the market. One founder talked about underestimating oneself and being insecure if their venture is legitimate enough to deserve support. Another talked about being faced with prejudices as women and being underestimated, which can be illustrated by this quote from founder F: *"sometimes we face challenges with the stereotypes that women, you know, in business, they didn't do the same quality, they don't know how to do business. And sometimes we face that. People underestimate us a lot, and it's quite frustrating."* Over time, and with more experience and legitimacy founder F describes *"now*

we already know, and we are used to those things, and we are ready to answer back to the people that make different comments and claims. Other than that, we are extremely visible in a lot of events, and we want to make our presence recognizable." Another founder shares their experience of being underestimated because of the founding team's age.

Another building block of where 'liability of newness' can be an obstacle, is with lacking **knowledge, experience, and capabilities**. One example is not knowing in which resource to invest into, as illustrated by G: *"ideally, you would all have the free students working for you, but sometimes at times they're just not there and you need to spend the money for it. Then it's really, really critical for is this worth the investment we're putting in now? I think that's the main difficulty, like knowing when your investment is worthwhile, but you never know that."*
Further, the interviewees described that the missing knowledge what to prioritize and the lack of knowledge in specific areas as problematic.

Further problems related to the 'liability of newness' that were mentioned in the interviews are related to missing **network**, difficulties in finding the own strategy and **outside influences** as well as not fully established **structures and processes** for the venture. This was described by founder A: *"Nobody has this strategic overview of what is happening now and how we can get there."*

Another important cause for problems in the venture development, is the **'liability of smallness',** that was mentioned by eight interviewees. The 'liability of smallness' is a concept in entrepreneurship that refers to the challenges and limitations that small firms face in competing with larger firms. It is often characterized by problems in obtaining the necessary monetary, material and human resources (Kale & Arditi, 1998). In the interviews this liability was mostly described through missing access to resources, such as human capital, location, equipment, and especially financial capital. Interviewee E: *"We always need money, and that is because we need a lot of data, or we would need a lot of data that costs a lot of money. So, if I had that money right now, I would have already bought that data and our machine learning model would have already been further developed."*

Additionally, seven founders talked about problems related to their ventures **team commitment and dynamics**. On the one hand, the founding teams struggeled with differing needs & expectations. On the other hand, founders described their team members having personal crises or leaving the venture. This is complemented by lacking commitment of the team to the venture, as illustrated by founder J, which in their case led to a termination of the venture: *"It was just like an individual decision to not keep up the keep up the pace and to actually fulfill the whole like the full commercialization of the of the start-up."*

Further, problems in the ventures **business concept** were mentioned by six founders. These obstables were in most cases related to realizations regarding customers, the industry, the market in regard to expectations and competitiveness. This was highlighted by founder G, who describes the problem that led his team to redefine their business proposition: "The whole market of physical therapy was really closed off, and there's not a lot of room for innovation. They do not have a lot of time, they don't have a lot of time per patient, and also using a system like that, it's too much, I think, for the average physical therapist. So, there were some interested, but not really enough to make a solid business model." Other interviewees also described that their business concept was not refined enough, or they had troubles relating to their revenue model.

Finally, three interviewees talked about **external factors** hindering their venture on the path to success. These factors were mainly governmental or institutional regulations.

It can be concluded, that the 'liabilities of newness and smallness' are the most evident barriers in the process of establishing student ventures. This is closely followed by problems with the team commitment and dynamics, the development of the business concept and some external factors.

5.1.2. Support

The first order concept of support is split into support structures that were mentioned as either 'existing' or 'missing' as well as support evaluation as 'helpful' and 'not helpful', as illustrated in Figure 2.

The **existing support structures** described by the founders strechted from family and friends over university professors, incubators/accelerators, governmental programs, private equity investors and industry contacts.

In contrast, four founders mentioned that they were **lacking or missing support structures** in terms of feedback from experienced people, someone external to do sparring with or a connection to other start-ups that enables exchange and mutual support. Additionally, two interviewees pointed out that they did not have any support structures at their home universities. Aspects named once by different interviewees were: help with finding investors, the opportunity for more exposure of the ventures, a public grant to offer protection to the ventures customers and governmental legal advice.

Further, two interviewees missed specific human resource networks. Founder D described that they are *"missing a network of people that want to be in a start-up and are willing to actually take responsibility and steer the ship in a start-up"* while founder G saw a missed opportunity ***"****There are a lot of students who want to do assignments and work and research at companies, but there is no real platform to match those people together."*

In terms of evaluating the support they obtained whilst their venture development, a few founders metioned especially **helpful support** they received.

Learning from other entrepreneurs ahead of the ventures own journey or sparring with other entrepreneurs who are about as far as the venture in question, was mentioned most often.

Other than that, a few interviewees acknowledged investors or university incubators/accelerators that did not only support the ventures with financial means but also with a network and business advice. This was also pointed out by interviewee C saying: "*The early investors, they were very helpful and kind of introducing us and also like showing us how everything runs and like giving advice on how a company kind of works".*

Often percieved as helpful was being part of an incubator or accelerator, especially the coaching support many offered. Additionally, two interviewees said, that they value that their idea is safe in the university incubator or accelerator context, as stated by founder E *"we don't have to fear anything, the university is not going to steal our idea".*

Further named was entrepreneurial education by the unversity, literature as well as online content as sources for learning. Also mentioned as valuable were knowledge resources from the ventures industry as well as the support by family and friends.

To close the support section, three interviewees talked about **support structures** they experienced that can be **improved**. Surprisingly, all three, being part of different university incubators or accelerators mentioned something related. They talked about personnel working at these institutions that was not experienced enough, as described by B *"the people there are not super innovative or founders […]. It's more like people who used to study something in this direction of innovation, but they had no real experience."* In addition they said "*the start-ups helped us way more than the consultants",* which is in line what founder C experienced.

On top of that, founder I critized the coaches of their university incubator/accelerator by saying: "they're not in the office. They like sparsely reply to emails, so they're not really a help anymore.", which was also described by another interviewee.

It can be concluded that while a wide variety of support structures for student ventures exist, not all of them are equally helpful. While being part of an incubator or accelerator is percieved as helpful, it is important that the founders have a contact person that is available on short notice, as the venture development often progresses rapidly. The most missed support was exactly that – someone experienced to do sparring with or a network to exchange and mutually support each other.

5.1.3. Answers to research questions

The first question addressed through this research was: '*Which entrepreneurial competencies do student entrepreneurs need for their new ventures to reach the credibility threshold?*' To answer that, a literature review was performed, which yielded the result, that there are three main entrepreneurial competencies, that student entrepreneurs need, to overcome the threshold of credibility.

In short, the opportunity refinement competency is related to recognizing the business opportunity and developing it over time into a functioning business concept. Further, the leveraging competency related to the internal and external resource acquisition, the combination of these resources and the enablement of the venture's development. Finally, the championing competency is necessary for student entrepreneurs, because they need to be commited to the venture and be able to sway other people to provide something to its development.

Overall, these competencies do not necessarily need to be supplied by one founding team member, but can be distributed over multiple stakeholders, internal and external to the venture. Nascent ventures often do not possess all these competencies in the beginning, but their success is determined by being able to gradually develop or externally acquire them.

The second research question that was investigated was: '*To what extent do the entrepreneurial competencies impact overcoming the threshold of credibility in a student venture?*' This was investigated through a small-scale qualitative research, namely ten semi-structured interviews with student entrepreneurs. Coding the interview transcripts lead to ten individual stories, of how the ventures developed over time, which of the three entrepreneurial competencies they possessed to which extent, and if they reached the threshold of credibility. Further, the mentioned support structures as well as problems and barriers, the ventures encountered were gathered. Conducting a cross-case comparison of the venture's development paths, yielded four generalized trajectories, that are illustrated in Figure 3. It shows how four development paths, shown as numbered graphs, developed over time and in terms of how much credibility they gained on the market. The ultimate outcome or success factor is depicted as the dotted line, representing the threshold of credibility.

In Figure 3, trajectory 1 refers to student ventures that are possessing all competencies to some degree and manage to develop and acquire the missing components over time. This leads to credibility on the market, i.e., external equity funding. The second trajectory stands for student businesses that already possess all necessary competencies to some degree or were able to develop and acquire them but are too early-stage to tell if they will overcome the threshold of credibility, indicated by the question mark. In contrast, trajectory three represents ventures that lacked the necessary competencies and did not manage to develop or externally acquire them, resulted in them not being able to develop sufficient credibility on the market. Finally, trajectory four depicts the development

of student ventures that either crossed the threshold of credibility or were on a promising road towards it. In their case the venture development was terminated due to a lack in commitment, i.e., a lack in championing competency, in the founders that could not be supplied externally.

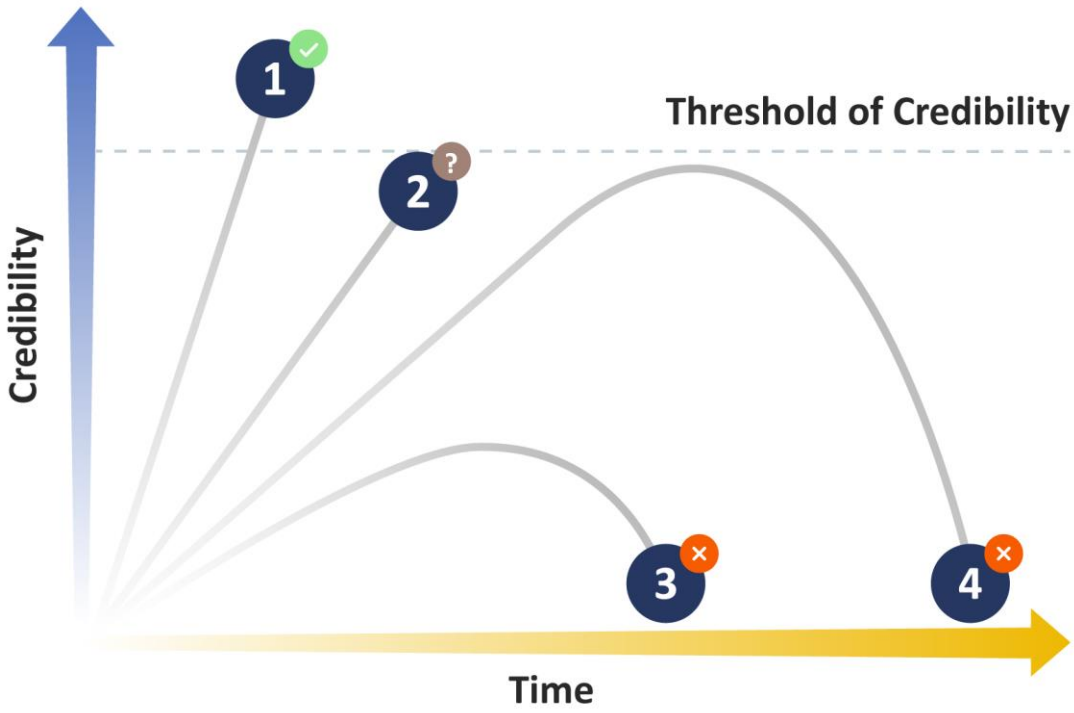


Figure 3: Trajectory Graph.

Overall, it needs to be emphasized that the development of the nascent ventures credibility on the market is no linear development, but rather fluctuates over time, which is simplified in the graphs illustrations.

5.2. Theoretical Contribution, Limitations and Future Research

The conducted research aimed to enhance the understanding of the competency creation process of student entrepreneurs. As Hayter et al. (2017) pointed out, performing inductive qualitative research into the phenomenon of student entrepreneurship is necessary to deepen the understanding of it, as the existing research on student entrepreneurship is still limited. This research contributed to this theory building by focusing on a particular timeframe in the venture creation process, examining the development of the necessary entrepreneurial competencies as proposed by Rasmussen et al. (2011). It broadened the theoretical knowledge base by confirming that the competencies identified by Rasmussen et al. (2011) namely, opportunity refinement, championing and leveraging, are also relevant for student entrepreneurs, as they were previously only examined in the context of academic entrepreneurship.

Additionally, this research does not only focus on the student entrepreneur itself but uses a multi-level approach, taking the competencies provided by co-founders and the external environment of the venture into account. This is in line with the research that Davidsson and Wiklund (2001) suggested, emphasizing that entrepreneurship always happens in a multi-faceted environment, where different levels from the individual entrepreneur to the economy-at-large complement and interact with each other.

This study is contributing to the theory building around the competencies of student entrepreneurs in the early venture creation process, but in that limited to ten examined cases. Further, the national environment of this research stretched over two European countries, the Netherlands and Germany. To increase the validity of the results, it would be advisable to replicate the study in specific national or institutional settings. Especially the problems and support structures might vary greatly among different ecosystems. Apart from the scale of this study, also the longitude by which the ventures are accompanied is limited. To refine the trajectory approach, it would be advisable to contact the ventures again the previously had not reached the credibility threshold, to map their development to the trajectory they were allocated to.

As touched upon before, this research opens up several avenues of future research. On the one hand, there might be value in applying this research to another country, institutional setting or group of entrepreneurs. Replicating this research with student entrepreneurs that are supported by university incubators or accelerators in a certain country, might result in country-specific barriers and support needs. That knowledge would be a lever to enhance the survival of student ventures in the illuminated environment. Further, acquiring this knowledge would enable cross-country comparisons. Additionally, when the general theory on the competencies of student entrepreneurs is more established and refined, it can be further detailed by conducting research for different groups such as e.g., female student entrepreneurs.

On the other hand, the student venture creation process can be investigated further. In this study, the framework by Vohora et al. (2004) was applied, which was originally conceptualized for university spinout companies. It is reasonable to assume that this framework can be adapted for the student venture creation process.

In the area of entrepreneurial competencies lies additional potential for future research. It was established that the three entrepreneurial competencies as suggested by Rasmussen et al. (2011) are necessary for the student ventures to reach the threshold of credibility and can partially be supplied externally. What is still unknown is which of these competencies are only necessary in the early stages of venture creation and which ones are needed for the long-term survival and growth of the venture.

Further, it is possible that some competencies or parts of them and only be supplied externally for a limited amount of time and need to be incorporated into the venture at some point.

Finally, the developed trajectories should be investigated in an empirical setting to validate them. As suggested above, the trajectories should be further refined by accompanying the ventures for a longer period and investigating which ones ended up crossing the threshold of credibility. In addition, is it especially relevant to identify which trajectories are related to the long-term growth and survival of the ventures beyond the threshold of credibility.

5.3. Practical Contribution

The beneficiaries of this research, from a practical perspective, can be all parties involved in working with, investing in or supporting student ventures. Further, individual entrepreneurs or founding teams might benefit by understanding which competencies they have, how they complement one another and what they can externally acquire. In a similar manner, (university) incubators and accelerators can assess which competencies a venture team already possesses, and how it can be optimally supported. Further, this research helps to refine support strategies by highlighting which competencies can be externally supplied, and which are harder to influence as they have a lot to do with the individuals involved. To illustrate, in the championing competency the commitment and motives of the founders cannot be directly influenced, but need to be inherent in the founding team.

Further, this research illuminated the barriers and support structures surrounding student ventures. Knowing recurring problems and understanding which support mechanisms are most helpful for student entrepreneurs, might help the (university) incubators and accelerators to optimize their efforts. Overall, this might increase the number and chance of success for student entrepreneurs. Which is a vehicle for university support institutions to creating a more entrepreneurial university. In a larger context, successful student entrepreneurship contributes to economical and societal development.

5.4. Conclusion

While student entrepreneurship is a common phenomenon — important for knowledge translation from an academic environment to an economic one — it is underrepresented in academic research. Therefore, a more robust body of research must still be undertaken, to which this thesis aims to contribute. The unique scope of this study was the adaption of the competency perspective developed for academic entrepreneurship for student entrepreneurship. A qualitative approach was taken to better understand the multi-level dynamics of student venture creation. Overall, the competency perspective proved to be useful for understanding the formation of student ventures, as well as the

support needs of student founders and the barriers they encounter. Further, the competency perspective can be used to optimize support mechanisms and increase student venture success rates.

References

About us: Novel-T | Now meet our experts. (n.d.). Novel-T. Retrieved March 31, 2022, from https://novelt.com/en/aboutus/

Åstebro, T., Bazzazian, N., & Braguinsky, S. (2012). Startups by recent university graduates and their faculty: Implications for university entrepreneurship policy. *Research Policy*, *41*(4), 663–677. https://doi.org/10.1016/j.respol.2012.01.004

Bergen, N., & Labonté, R. (2020). "Everything Is Perfect, and We Have No Problems": Detecting and Limiting Social Desirability Bias in Qualitative Research. *Qualitative Health Research*, *30*(5), 783–792. https://doi.org/10.1177/1049732319889354

Bergmann, H., Hundt, C., & Sternberg, R. (2016). What makes student entrepreneurs? On the relevance (and irrelevance) of the university and the regional context for student start-ups. *Small Business Economics*, *47*(1), 53–76. https://doi.org/10.1007/s11187-016-9700-6

Block, J. H., Fisch, C. O., & van Praag, M. (2017). The Schumpeterian entrepreneur: A review of the empirical evidence on the antecedents, behaviour and consequences of innovative entrepreneurship. *Industry and Innovation*, *24*(1), 61–95. https://doi.org/10.1080/13662716.2016.1216397

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2012). Thematic analysis. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, Vol 2: Research designs: Quantitative, qualitative, neuropsychological, and biological.* (pp. 57–71). American Psychological Association. https://doi.org/10.1037/13620-004

Brinckmann, J. (2008). *Competence of Top Management Teams and Success of New Technology-Based Firms*. Gabler. https://doi.org/10.1007/978-3-8350-5503-2

Burgelman, R. A. (1991). Intraorganizational Ecology of Strategy Making and Organizational Adaptation: Theory and Field Research. *Organization Science*, *2*(3), 239–262. https://doi.org/10.1287/orsc.2.3.239

Cassell, C., & Symon, G. (Eds.). (2004). *Essential guide to qualitative methods in organizational research*. SAGE Publications.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed). Sage Publications.

Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed). SAGE Publications.

Davidsson, P., & Wiklund, J. (2001). Levels of Analysis in Entrepreneurship Research: Current Research Practice and Suggestions for the Future. *Entrepreneurship Theory and Practice*, *25*(4), 81–100. https://doi.org/10.1177/104225870102500406

DeJonckheere, M., & Vaughn, L. M. (2019). Semistructured interviewing in primary care research: A balance of relationship and rigour. *Family Medicine and Community Health*, *7*(2), e000057. https://doi.org/10.1136/fmch-2018-000057

Denzin, N. K., & Lincoln, Y. S. (Eds.). (1994). *Handbook of qualitative research*. Sage Publications.

Edwards, R., & Holland, J. (2013). *What is Qualitative Interviewing?* Bloomsbury Academic. https://doi.org/10.5040/9781472545244

Etzkowitz, H. (2001). The second academic revolution and the rise of entrepreneurial science. *IEEE Technology and Society Magazine*, *20*(2), 18–29. https://doi.org/10.1109/44.948843

Flick, U. (2009). *An introduction to qualitative research* (4th ed). Sage Publications.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology. *Organizational Research Methods*, *16*(1), 15–31. https://doi.org/10.1177/1094428112452151

Global Entrepreneurship Monitor. (2023). *Global Entrepreneurship Monitor 2022/2023 Global Report: Adapting to a "New Normal".* London.

Graneheim, U. H., Lindgren, B.-M., & Lundman, B. (2017). Methodological challenges in qualitative content analysis: A discussion paper. *Nurse Education Today*, *56*, 29–34. https://doi.org/10.1016/j.nedt.2017.06.002

Gruber, T., Szmigin, I., Reppel, A. E., & Voss, R. (2008). Designing and conducting online interviews to investigate interesting consumer phenomena. *Qualitative Market Research: An International Journal*, *11*(3), 256–274. https://doi.org/10.1108/13522750810879002

Guest, G., Bunce, A., & Johnson, L. (2006). How Many Interviews Are Enough?: An Experiment with Data Saturation and Variability. *Field Methods*, *18*(1), 59–82. https://doi.org/10.1177/1525822X05279903

Hayter, C. S., Lubynsky, R., & Maroulis, S. (2017). Who is the academic entrepreneur? The role of graduate students in the development of university spinoffs. *The Journal of Technology Transfer*, *42*(6), 1237–1254. https://doi.org/10.1007/s10961-016-9470-y

Hayton, J. C., & Kelley, D. J. (2006). A competency-based framework for promoting corporate entrepreneurship. *Human Resource Management*, *45*(3), 407–427. https://doi.org/10.1002/hrm.20118

Holienka, M., Gál, P., & Kovačičová, Z. (2017). Drivers of Student Entrepreneurship in Visegrad Four Countries: Guesss Evidence. *Central European Business Review*, *6*(2), 54–63. https://doi.org/10.18267/j.cebr.180

Howell, J. M., & Higgins, C. A. (1990). Champions of Technological Innovation. *Administrative Science Quarterly*, *35*(2), 317. https://doi.org/10.2307/2393393

Hyde, K. F. (2000). Recognising deductive processes in qualitative research. *Qualitative Market Research: An International Journal*, *3*(2), 82–90. https://doi.org/10.1108/13522750010322089

Jansen, S., van de Zande, T., Brinkkemper, S., Stam, E., & Varma, V. (2015). How education, stimulation, and incubation encourage student entrepreneurship: Observations from MIT,

IIIT, and Utrecht University. *The International Journal of Management Education*, *13*(2), 170–181. https://doi.org/10.1016/j.ijme.2015.03.001

Jovchelovitch, S., & Bauer, M. W. (2000). Narrative interviewing. In *Qualitative Researching With Text, Image and Sound: A Practical Handbook.* (pp. 57–74). Sage.

Kale, S., & Arditi, D. (1998). Business Failures: Liabilities of Newness, Adolescence, and Smallness. *Journal of Construction Engineering and Management*, *124*(6), 458–464. https://doi.org/10.1061/(ASCE)0733-9364(1998)124:6(458)

Kallio, H., Pietilä, A.-M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: Developing a framework for a qualitative semi-structured interview guide. *Journal of Advanced Nursing*, *72*(12), 2954–2965. https://doi.org/10.1111/jan.13031

Lewis-Beck, M., Bryman, A., & Liao, T. (2004). Coding Qualitative Data. In *The SAGE Encyclopedia of Social Science Research Methods* (Vol. 1–3, pp. 138–138). SAGE Publications, Inc. https://doi.org/10.4135/9781412950589

Lockett, A., & Wright, M. (2005). Resources, capabilities, risk capital and the creation of university spin-out companies. *Research Policy*, *34*(7), 1043–1057. https://doi.org/10.1016/j.respol.2005.05.006

Lombardi, R., Schimperna, F., Paoloni, P., & Galeotti, M. (2022). The climate-related information in the changing EU directive on non-financial reporting and disclosure: First evidence by Italian large companies. *Journal of Applied Accounting Research*, *23*(1), 250–273. https://doi.org/10.1108/JAAR-04-2021-0117

Luthje, C., & Franke, N. (2003). the “making” of an entrepreneur: Testing a model of entrepreneurial intent among engineering students at MIT. *R and D Management*, *33*(2), 135–147. https://doi.org/10.1111/1467-9310.00288

Maidique, M. A. (1980). Entrepreneurs, champions, and technological innovation. *Sloan Management Review*, *21*(2), 59–76.

Marchand, J., & Hermens, A. (2015). Student Entrepreneurship: A Research Agenda. *Undefined*. https://www.semanticscholar.org/paper/Student-Entrepreneurship%3A-A-Research-Agenda-Marchand-Hermens/9ef3156736a3bc7eabbc1a8f4e6041a744153d9d

Maresch, D., Harms, R., Kailer, N., & Wimmer-Wurm, B. (2016). The impact of entrepreneurship education on the entrepreneurial intention of students in science and engineering versus business studies university programs. *Technological Forecasting and Social Change*, *104*, 172–179. https://doi.org/10.1016/j.techfore.2015.11.006

OECD & European Union. (2018). *Supporting Entrepreneurship and Innovation in Higher Education in The Netherlands*. OECD. https://doi.org/10.1787/9789264292048-en

Politis, D., Winborg, J., & Dahlstrand, Å. L. (2012). Exploring the resource logic of student entrepreneurs. *International Small Business Journal: Researching Entrepreneurship*, *30*(6), 659–683. https://doi.org/10.1177/0266242610383445

Rasmussen, E., Mosey, S., & Wright, M. (2011). The Evolution of Entrepreneurial Competencies: A Longitudinal Study of University Spin-Off Venture Emergence: The Evolution of Entrepreneurial Competencies. *Journal of Management Studies*, *48*(6), 1314–1345. https://doi.org/10.1111/j.1467-6486.2010.00995.x

Röpke, J. (2002). *Der lernende Unternehmer: Zur Evolution und Konstruktion unternehmerischer Kompetenz*. Marburger Förderzentrum für Existenzgründer aus der Univ.

Russo, S., Schimperna, F., Lombardi, R., & Ruggiero, P. (2022). Sustainability performance and social media: An explorative analysis. *Meditari Accountancy Research*, *30*(4), 1118–1140. https://doi.org/10.1108/MEDAR-03-2021-1227

Saeed, S., Yousafzai, S. Y., Yani-De-Soriano, M., & Muffatto, M. (2015). The Role of Perceived University Support in the Formation of Students' Entrepreneurial Intention. *Journal of Small Business Management*, *53*(4), 1127–1145. https://doi.org/10.1111/jsbm.12090

Sandelowski, M. (1995). Sample size in qualitative research. *Research in Nursing & Health*, *18*(2), 179–183. https://doi.org/10.1002/nur.4770180211

Schimperna, F., Nappo, F., & Marsigalia, B. (2021). Student Entrepreneurship in Universities: The State-of-the-Art. *Administrative Sciences*, *12*(1), 5. https://doi.org/10.3390/admsci12010005

Sharma, G. (2017). Pros and cons of different sampling techniques. *International Journal of Applied Research*, *3*(7), 749–752.

Shirokova, G., Osiyevskyy, O., Morris, M. H., & Bogatyreva, K. (2017). Expertise, university infrastructure and approaches to new venture creation: Assessing students who start businesses. *Entrepreneurship & Regional Development*, *29*(9–10), 912–944. https://doi.org/10.1080/08985626.2017.1376516

Sieger, P., Reamy, L., Zellweger, T., Fueglistaller, U., & Hatak, I. (2021). *Global Student Entrepreneurship 2021: Insights From 58 Countries*. https://www.guesssurvey.org/resources/PDF_InterReports/GUESSS_2021_Global_Report.pdf

Singh, A. S., & Masuku, M. B. (2013). *FUNDAMENTALS OF APPLIED RESEARCH AND SAMPLING TECHNIQUES*. *2*(4), 10.

Sjödin, D., Parida, V., Kohtamäki, M., & Wincent, J. (2020). An agile co-creation process for digital servitization: A micro-service innovation approach. *Journal of Business Research*, *112*, 478–491. https://doi.org/10.1016/j.jbusres.2020.01.009

Skute, I., Zalewska-Kurek, K., Hatak, I., & de Weerd-Nederhof, P. (2019). Mapping the field: A bibliometric analysis of the literature on university–industry collaborations. *The Journal of Technology Transfer*, *44*(3), 916–947. https://doi.org/10.1007/s10961-017-9637-1

Startup Genome. (2019). *Global Startup Ecosystem Report*. https://startupgenome.com/reports/global-startup-ecosystem-report-2019

Tittel, A., & Terzidis, O. (2020). Entrepreneurial competences revised: Developing a consolidated and categorized list of entrepreneurial competences. *Entrepreneurship Education*, *3*(1), 1–35. https://doi.org/10.1007/s41959-019-00021-4

Vohora, A., Wright, M., & Lockett, A. (2004). Critical junctures in the development of university high-tech spinout companies. *Research Policy*, *33*(1), 147–175. https://doi.org/10.1016/S0048-7333(03)00107-0

Wilson, C. (2014a). Semi-Structured Interviews. In *Interview Techniques for UX Practitioners* (pp. 23–41). Elsevier. https://doi.org/10.1016/B978-0-12-410393-1.00002-8

Wilson, C. (2014b). Unstructured Interviews. In *Interview Techniques for UX Practitioners* (pp. 43–62). Elsevier. https://doi.org/10.1016/B978-0-12-410393-1.00003-X

Wolf, C. (2017). *The Sage handbook of survey methodology*. Sage Reference.

Wright, M., Siegel, D. S., & Mustar, P. (2017). An emerging ecosystem for student start-ups. *The Journal of Technology Transfer*, *42*(4), 909–922. https://doi.org/10.1007/s10961-017-9558-z

Appendix

Interview Protocol

Introduction

Thanking

Hello, thank you so much for agreeing to take part in this interview!

Goal

With our conversation, I would like to get to know more about your experience of the initial process of starting your venture.

Rules

You can end the interview at any given moment in time without giving any reason. If you do not want to answer a particular question, just say so, and I will skip it.

Remember, that I am interested in your experience and perceptions, so there are no right or wrong answers. Please try to be as honest as possible!

Recording

To be able to analyze the interview more precisely, and to focus entirely on our conversation instead of on taking notes, I would like to record the interview. The recording will be deleted as soon as I have finished the transcript. Do you agree that we can record our conversation?

Data Handling

All data will be anonymized so that people cannot trace it back to you as a person or your venture. The recording will be deleted as soon as I finished the anonymized transcript.

Questions

Do you have any questions?

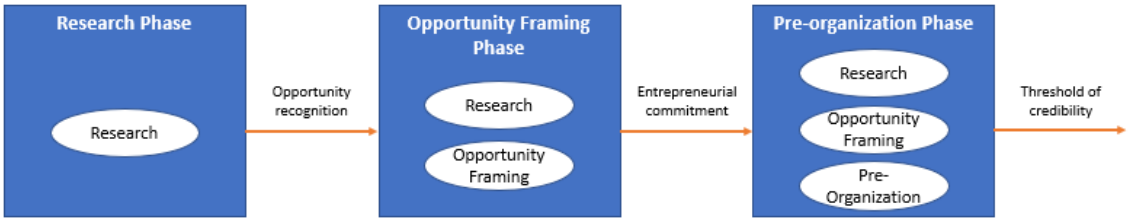
I will start the recording now and we will start the interview.

A. Central properties (maybe send out as pre-read)

Who is/are the founder(s)?
Are there additional team members?
If yes, in which roles do they have?
How many employees are there in total?
When did the process of founding the venture begin?
(How is the ownership structured?)
Where did the idea come from?
Which industry does the venture operate in?
What is the product?
What is the business model?
How much initial funding did you obtain?
If you had additional funding rounds, how much funding did you obtain there?

B. The Venture Development Process

Now, I want to understand the early stage of your venture development. To make it easier, I want to show you a model that broadly describes the first three phases of starting a new venture.



As you can see there are three phases shown as boxes. The arrows between the boxes represent problems that need to be solved to transition to the next phase.

So, ***Phase 1*** *is the* ***'research'*** *phase where scientific or some form of research is done, leading to the business opportunity. Here the problem is that the opportunity needs to be recognized. Then,* ***phase 2*** *that is about framing the opportunity. This phase is about figuring out the business concept (i.e., writing a business plan) and checking if there is enough value in the opportunity for commercialization. The problem closing that phase is the* ***'entrepreneurial commitment'****. The entrepreneur needs to commit himself/herself to develop the opportunity into a business.*
The initial venture creation process ends with the ***third phase*** *that is about* ***'pre-organization'*** *of the business. Here we talk about implementing strategic plans. This can be deciding on which resources and capabilities to develop or acquire now or in the future or what markets to focus on.*
*This leads us to the problem '****gaining credibility'.*** *This can either be on the market by getting access to funding, establishing an entrepreneurial team, or gaining internal credibility at the university through an incubator program, etc.*

Here it is important to notice that it is just a model, so not every venture creation process happens in that sequence, but it is a helpful tool to structure the different experiences.
How would you say that your venture gained credibility? Was there a success milestone that you would define as you gaining credibility as a venture?

Now, I want to ask you different questions on how you experienced the venture creation process. Please keep in mind that we only talk about the initial phase until reaching credibility , so the three phases. When applicable, I want you to tell me how the element evolved over time.

Additional follow-up questions: "Can you elaborate on that?"; "When did that happen?"; "How did that change over time?"; "In which phase of venture development would you say that that was most relevant?".

C. Competencies, barriers, and support flows

Opportunity refinement competency:

How was the **business opportunity** for your venture identified/recognized? Who was involved in what way?

Who contributed to developing the **business concept** in what way? How did it change over time?

Where did the **market-related knowledge** come from (did you conduct customer research or did someone else supply market knowledge?)?

When you think about the development of the **business concept** – what kind of problems did you encounter?
(If there were some) How did you solve them?
What kind of external support (e.g., by the university) did you have in that phase?
What kind of additional support would you have needed in that phase?

Leveraging competency:

Who developed and integrated the **external and internal resources** of the venture? In other words, for a venture to develop, it needs resources such as human or financial resources – who decided which ones are needed and where they can come from?
Who interacted with **external resource providers** (such as industry partners or investors)?
How did the venture gain **credibility** over time? Who contributed to that development in what way?
Where did the **entrepreneurial experience** come from (did you or someone in your team develop/supply it or did someone external supply that experience?)?

When you think about **developing and integrating the necessary resources** – what kind of problems did you encounter?
(If there were some) How did you solve them?
What kind of external support (e.g., by the university) did you have in that phase?
What kind of additional support would you have needed in that phase? aa

Championing competency:

Who took on which **roles** in the initial stages of venture development? Did the roles change over time?
How did the **personal commitment** of the different actors (can be anyone involved, internal as well as external) develop over time?
Were there **external supporters** driving the venture creation forward? If yes, in what way did they support the venture development?

When you think about **driving the venture development** – what kind of problems did you encounter?

(If there were some) How did you solve them?

What kind of external support (e.g., by the university) did you have in that phase?

What kind of additional support would you have needed in that phase?

Additional follow-up questions: "Can you elaborate on that?"; "When did that happen?"; "How did that change over time?"; "In which phase of venture development would you say that that was most relevant?".