

The paradox of academic entrepreneurship

A study to understand context and motivations of academics that decide to become an entrepreneur for knowledge commercialization

Master Thesis Business Administration

Entrepreneurship, innovation, and strategy
University of Twente

T. Bevers

Keywords: Academic entrepreneurship, entrepreneurial context, entrepreneurship, entrepreneurial motivation.

07-07-2021

Final version

1st supervisor: Dr. D.E. Proksch (*University of Twente*)

2nd supervisor: Dr. R. Harms (*University of Twente*)

External Supervisor: Dr. D.A. Bekke (*Saxion University of Applied Sciences*)

*“Everyone can tell you the risk,
an entrepreneur can see the reward.”*

~ Robert Kiyosaki

Acknowledgment

In front of you lies the Master Thesis “*The paradox of academic entrepreneurship*”. This thesis was written as part of the graduation trajectory of the master Business Administration at the University of Twente. During a special time, when I had to graduate for the second time completely from home, I am both proud and relieved to be able to deliver this thesis.

There are several (groups of) people who have made this thesis possible, for which I would like to express my gratitude. First of all, all the respondents who took part in the interviews, without you conducting this research would have been impossible. From the University of Twente, I would like to thank Dorian Proksch for his guidance as the first supervisor of this thesis and especially for the enthusiasm with which he managed to motivate me. In addition, my acknowledgments to the second supervisor, Rainer Harms, for his valuable feedback on the thesis. I am also grateful to Saxion and all my direct colleagues for making it possible to combine work with a full-time master's study.

Tom Bevers
Enschede, 07-07-2021

Abstract

The motivations and context of academics who decide to become entrepreneurs are less well researched. Knowledge institutions, such as universities, that employ academics are playing an increasingly important role in society because of knowledge commercialization becoming a standard. However, at the moment, institutions have only limited control over their employees when it comes to this type of entrepreneurial activity. This study aims to determine which context and motivational factors arise around this topic, academic entrepreneurship, for technology start-ups in the Netherlands. The goal is to identify this valuable insight for both universities and the academics themselves to learn how to cope with the subject. Building on existing work, a framework has been designed to map academic entrepreneurship in which the academic who commences into an entrepreneurial process to become an entrepreneur is central. Context and motivation are included in this framework as influencing factors. Context is defined in this research as drivers and barriers and motivation is defined as motives.

Based on the theoretical framework from a systematic literature review, interviews were conducted to determine which context and motivational factors occur in practice at the moment that academics commence an entrepreneurial process. For this purpose, the respondents were divided into three groups, those who remain academic, hybrid entrepreneurs, and full-time entrepreneurs. After analysis of the interviews, barriers and drivers have been found in the environmental, institutional, and personal context of academic entrepreneurship. Most barriers and restraining factors come from the institution, while most drivers have been identified from the environment and personal side. For the motivation to become entrepreneur, multiple factors were found within the categories: career advancement, financial, contribution to society, and intellectual challenge, confirming the theoretical framework. In addition, motivational factors related to entrepreneurial passion were found. Finally, doubt and uncertainty play a role as the reason why academics do not commence an entrepreneurial process. When investigating hybrid entrepreneurs, they have advantages because of still being connected to the institution. On the one hand, intrinsic motivation for education applies here, but also a degree of certainty. On the other hand, full-time entrepreneurship provides a certain focus and dedication that brings benefits to the start-up. In conclusion, hybrid entrepreneurship can be seen as middle ground but also an intermediate step for full-time entrepreneurship.

The results support prior research on motivation for entrepreneurship and confirm the increasing role of entrepreneurial passion. In addition, the effect of doubt and uncertainty as a restraining factor has emerged. The institution is seen as a barrier that has an effect on this doubt and uncertainty. Therefore, among other things, a reconsideration of academic entrepreneurship policy is recommended, for which a checklist has been drawn up.

Table of content

Acknowledgment	4
Abstract	5
1. Introduction	7
2. Theory	10
2.1 Literature base	10
2.2 Systematic literature review approach.....	10
2.3 Entrepreneurial character of academics.....	12
2.3.1 Entrepreneurial behavior of academics	14
2.3.2 Sub-conclusion	15
2.4 Entrepreneurial career paths of academics	15
2.4.1 Hybrids	16
2.4.2 Sub-conclusion	16
2.5 Context and personal motivations for entrepreneurship.....	17
2.5.1 Context of entrepreneurship	17
2.5.2 Motivation	18
2.5.3 Sub-conclusion	20
2.6 Theoretical framework	21
3. Method	22
3.1 Research design.....	22
3.2 Data collection.....	23
3.3 Data analyses	24
4. Results	26
4.1 Context	26
4.2 Motivation	30
5. Conclusion and discussion	37
5.1 Key findings	37
5.2 Implications	43
5.3 Limitations.....	46
5.4 Future research	46
References	48
Appendix	52
Appendix 1: Interview questions.....	52
Appendix 2: Coding results	54

1. Introduction

Within the transition to the knowledge economy, universities are growing into an increasingly big role in economic development. This results in universities as a key actor for shaping the ecosystems around entrepreneurship. Important is the transfer of knowledge and technologies from universities to the industry. This means universities are not only shaping the entrepreneurial ecosystems but also become an actor in (inter)national innovation systems within industries (Miller, Alexander, et al., 2018).

Thereafter, this means that knowledge that is created in universities needs to find its way to the industry. According to the Ph.D. research of Marcolongo (2017), two ways usually ensure that scientific discoveries of academics are brought into commercial reality. These are 1) licensing intellectual property to existing corporations and 2) academic entrepreneurship. For licensing most universities have established technology transfer offices (TTOs) that deal with the commercialization of intellectual property that is owned by the university (Link et al., 2015). Often academics are passively involved, and the licensing process is managed by the TTO (Algieri et al., 2013). Contradictory, according to Balven et al. (2018), within academic entrepreneurship the contribution and engagement of the academic is relevant. This is because in this case the academic is the person who commercializes their technology as an entrepreneur. A more formal definition of academic entrepreneurship is: *“the commercialization of academic research ... the pursuit of future forms of value pertaining to academic knowledge production, application, and transmission”* (Wadhwani et al., 2017, p 175). As indicated, academic entrepreneurship in the current knowledge economy is a mean that mainly focuses on knowledge transfer (Miller, Alexander, et al., 2018). In the origins of academic entrepreneurship, it had a completely different purpose. It originated during the shift from a centrally planned economy to a market economy. Therefore, its main purpose was to make money, as grands were still emerging (Formica, 2002).

Today, academic entrepreneurship is more than a way of making money. It is an essential part of our economic development, which simultaneously means that also academics and universities are becoming more important for economic development (Miller, Alexander, et al., 2018). Besides, governments are also important stakeholders within academic entrepreneurship. Rasmussen and Gulbrandsen (2012) have researched government support programs (GSPs) for academic entrepreneurship. This study describes that the role of the government is not limited to offering incentives. The government is also involved in funding research, information facilitation, economic strategy development, and creating and maintaining infrastructure. From this introduction, it has become clear that universities and governments are jointly responsible for stimulating the commercialization of knowledge, but also for retaining the academic capacity for knowledge creation.

This is where the paradox of academic entrepreneurship comes in. On the one hand, academics are important within universities for the creation of knowledge and support the ecosystems of the knowledge economy (Miller, Alexander, et al., 2018). On the other hand, academics are important in commercializing knowledge, for which academic entrepreneurship is one of the most common ways (Balven et al., 2018). This paradox cannot only influence industries but also the broader ecosystems of entrepreneurship. A good balance between academics that remain academic and academics that become an entrepreneur is crucial. Factors such as intelligence, motivation, economic development, and technological development have an impact on entrepreneurship and therefore play a role in maintaining the balance of academic entrepreneurship. Since according to Balven et al. (2018) the academic fulfills an important role within academic entrepreneurship, so are the motivations of that person. It seems logical that universities and governments would like to control academics in decisions about their career path, to maintain this balance. However, academics are people, which means their actions cannot be directly controlled and their minds cannot be split. Something that can be done is incentivizing the decisions of academics by facilitating towards their personal motivations. To do so, the personal

motivations of academics to commence an entrepreneurial process, have to be known and understood. This research contributes to the understanding of these motivations. Besides, the context of academic entrepreneurship, containing barriers and drivers, is a key topic related to the personal motivations of academic entrepreneurs (Davey et al., 2016; Huang, 2018).

The practical relevance of this research is confirmed by the fact that it is carried out on behalf of Saxion University of Applied Sciences. Saxion is situated in the Netherlands with about 3.000 employees and 27.500 students¹. Retaining talent as a knowledge institution or letting it go into the industry is a complex problem that Saxion is dealing with. This research was formulated based on the problem expressed by Saxion. Therefore, the scope will be on employees as further clarification of academics. This is because academics is a broad concept and the specific request for help in this area lies with the employees of knowledge institutions. As a result, focusing on employees means that students who start up a company are not part of the research subjects. These employees of knowledge institutions are relevant to Saxion University of Applied Sciences because they are the drivers of knowledge creation for the universities and thus the balance between retaining and commercializing knowledge is even more crucial. Further elaboration of the scope can be found in section 3.2. The objective for the research was established based on this introduction, problem definition, and scope.

The goal of this research is to identify the personal motivations of employees of knowledge institutions and the relevant context. This is focussed on the moment the decision is made to commence an entrepreneurial process, that directs to becoming a full-time entrepreneur or a hybrid situation (career path). The research supports employees of knowledge institutions in their decisions and supports universities and governments to affect these decisions.

The exact scope of the research will be discussed in the methodology chapter (chapter 3). To reach the research objective, the main research question (MRQ) for this thesis is:

“What are personal motivations in context of academic entrepreneurial employees of knowledge institutions at the moment they decide to commence an entrepreneurial process in their career path?”

Answering this question consists of a theoretical and practical segment. In the theoretical segment (chapter 2) theory will be presented to base the methodology (chapter 3) and practical segment (chapter 4) on. Table 1.1 presents the six sub-questions that will answer the MRQ. For the theoretical segment sub-questions 1, 2, and 3 are answered and in the practical section sub-questions 4, 5, and 6.

Table 1.1 – Sub-questions for thesis research

Question number	Segment	Sub-question
1	Theory	How can academics be defined in relation to entrepreneurship?
2	Theory	What are the common entrepreneurial career paths for academics?
3	Theory	Which personal motivations and context for deciding to become an entrepreneur are known yet in literature?
4	Practise	What barriers and drivers form the context in deciding between remaining academic, becoming a hybrid, or a full-time entrepreneur?
5	Practise	What are the personal motivations of academic entrepreneurial employees of knowledge institutions to commence an entrepreneurial process?
6	Practise	What are the personal motivations of academic entrepreneurial employees of knowledge institutions to decide between becoming hybrid or a full-time entrepreneur?

¹ Saxion Facts and Figures: <https://www.saxion.edu/about-saxion/our-organisation/facts-and-figures>

The personal motivations are academically relevant since most research on academic entrepreneurship focuses on demography, economy, and universities on the macro-level. The research on the micro-level, concerning the academic entrepreneur, is more limited (Balven et al., 2018; Qian et al., 2018). But as also discussed by Miller et al. (2018), the academic is indeed a relevant person within academic entrepreneurship and the importance of the academic is often neglected. Also, the research ties in with current topics in the field of entrepreneurship. For example, there is currently an increasing amount of attention for topics such as passion and well-being. In many cases, this is directly related to personal motivation. For example, personal motivations can be the curiosity of entrepreneurs which is a common topic in research about entrepreneurial passion (Syed et al., 2020; Wach et al., 2020). The study of Davey, Rossano, and van der Sijde (2016) indicates that from an academic point of view it is relevant to include the context in studies aimed at academic entrepreneurship. Given that the context is different under different circumstances and therefore also exerts a different influence on the academic entrepreneur, the inclusion of context in these studies results in a broader understanding of the entrepreneurial context in literature.

In addition to academic relevance, this research also offers practical relevance. First of all, universities need to have a grip on academic entrepreneurship. Universities are getting more strategic in commercializing knowledge. A rethinking of academic entrepreneurship is necessary to enable universities to fulfill their new role in society (Siegel & Wright, 2015). Guerrero et al. (2016) confirm this proposition and discuss that much research on academic entrepreneurship is based on an industry perspective, which is strongly related to knowledge commercialization. However, for both universities and governments, knowledge creation is just as important (Balven et al., 2018; Rasmussen & Gulbrandsen, 2012). It can therefore be said that starting from an industry perspective gives a distorted picture and does not lead to a sustainable strategy in the field of academic entrepreneurship. In other words, academic entrepreneurship strategy development requires theoretical and empirical research from the perspective of the academic to be able to support universities and governments (Siegel & Wright, 2015). Finally, the problem formulated by the commissioning organization (Saxion University of Applied Sciences) confirms that this is a current and practical relevant study. The objective and research question are based on a request for help from Saxion, that both the employees and the organization itself need support in this regard.

After this introduction of the research topic, the thesis will continue in chapter 2 with the theory. A systematic literature review (SLR) was conducted and used to create a theoretical framework of motivations for academic entrepreneurship. Subsequently, in chapter 3 the methodology of the research will be discussed. This chapter starts with a conceptual model based on the theoretical framework (chapter 2) and the data collection and analysis methods will be discussed. Subsequently, in chapter 4 the results of the conducted research are presented. Here the results of the interviews are presented in a table that shows the coding and a further explanation is given. Finally, in chapter 5 the research is concluded with a conclusion and discussion. The contribution on both theoretical and practical level is also given here and the limitations are discussed.

2. Theory

In this chapter, the research area will be approached theoretically. First of all, an introduction to entrepreneurial motivation will be given in section 2.1. Based on this, an SLR has been carried out and the methodological basis for this is given in section 2.2. Subsequently, the theory is elaborated in sections 2.3, 2.4, and 2.5, which answer proportionally sub-questions 1, 2, and 3. Finally, in section 2.6 a theoretical framework is presented based on the SLR performed. This will be used as a basis for conducting the research.

2.1 Literature base

The article of Shane, Locke, and Collins (2003) was used as the starting point for the SLR. This research focuses on determining the influence of the entrepreneur and his motivations on an entrepreneurial process. The authors pay attention to generic and specific motivations for entrepreneurs and to factors and characteristics that can describe an entrepreneurial person. However, the vision of the entrepreneurial process is quite limited. Only an opportunity recognition approach is assumed. In more recent research, there is also attention for approaches such as opportunity creation (Félix-González et al., 2017). Despite the starting point of the entrepreneurial process, successfully completing it will lead to entrepreneurship. In this context, this means that there is an entrepreneur with an established company (Shane et al., 2003). Figure 2.1 shows a simplified model of entrepreneurial motivation, which is based on the results of the research from Shane et al. (2003). This figure starts with the entrepreneurial person and leads through the entrepreneurial process to entrepreneurial outcome by following the solid-lined arrows. This entrepreneurial outcome, therefore, depends on the person, but there is also another influencing factor, namely motivation factors. The dashed arrow from motivational factors indicates that it is an influencing factor and not a direct relationship. This means that motivation influences whether or not you start an entrepreneurial process. The SLR approach is based on the concepts of this model, namely 1) the entrepreneurial person, 2) the entrepreneurial outcome, and 3) the motivation factors.

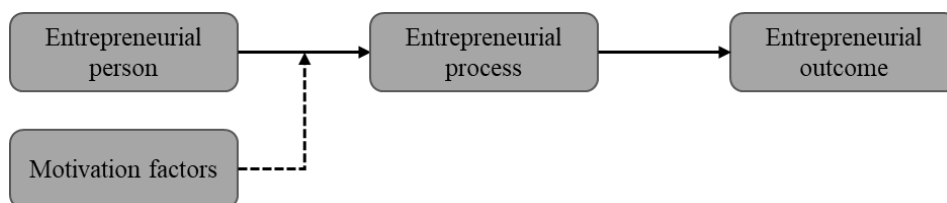


Figure 2.1 Model of entrepreneurial motivation

2.2 Systematic literature review approach

For the theory section, an SLR was conducted. This methodology has many applications, the following definition of SLR was used: “*SLR methodology focuses on precise research questions leading to precise outcomes by conducting a thorough review of relatively small number of publications.*” (Barn et al., 2017, p212). These questions are given in the introduction. Table 2.1 shows the concepts that were used to perform the initial literature search. These concepts are derived from the model in Figure 2.1 in correspondents with literature for orientation. In the general model (Figure 2.1) there is an entrepreneurial person, for academics literature states that these persons are academic entrepreneurs and there are also entrepreneurial academics (Balven et al., 2018; Miller, Alexander, et al., 2018; Siegel & Wright, 2015). The personal motivation from the model in Figure 2.1 has been adopted without modification as a concept for the SLR (Shane et al., 2003). Finally, the outcome, entrepreneurship, has been added as a third concept.

Table 2.1 Concepts and syntax for SLR

Concepts	Related terms	Syntax
1 Academic entrepreneur	Educational entrepreneur Academic entrepreneurship	("academic entrepreneur" OR "academic entrepreneurship" OR "educational entrepreneur")
2 Motivations	Drivers Reasons Motives	(motivations OR drivers OR reasons OR motives)
3 Entrepreneurship	Entrepreneurial Entrepreneur	(entrepreneur OR entrepreneurial OR entrepreneurship)

The literature selection procedure is based on Barn et al. (2017) and Weißer et al. (2020). The syntax from Table 2.1 has been entered in the academic search engine Web of Science. The given results have been exported to a database for the execution and maintenance of the selection procedure. The core of the selection procedure consisted of three steps. First of all, the title, keywords, and summary were read and it was determined whether the subject of the articles was in line with the MRQ and sub-questions for this research. This step has resulted in a 28% reduction in the number of articles. The second step then ensures that the articles are recent and have an impact. For recency, the criterion has been used to include a decade of literature. This means that only literature published between 2011 and 2021 is included. For the impact, first of all it was checked whether the article was actually published. The selection was then made on the basis of the Eigenfactor score of the journal in which the article was published. All articles in a journal without a positive Eigenfactor have been disregarded. All in all, this step has resulted in an 39% reduction in the number of articles that passed the first step. The final reduction step is to read the overall article. This resulted in a reduction of 35% of the articles that passed the first and second steps. Ultimately, 28 articles were selected based on the SLR. Finally, 2 additional articles were selected by means of back referencing, this brings the final total to 30 articles for writing the theory chapter.

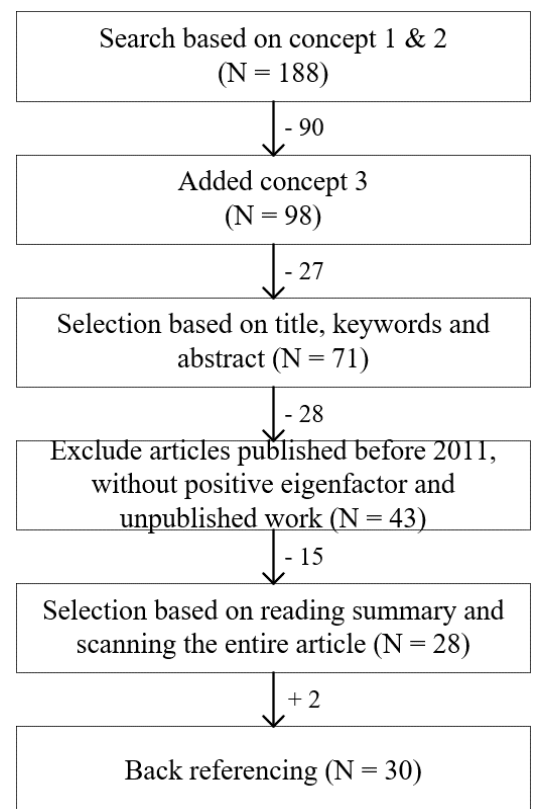


Figure 2.2 - SLR selection process

Based on the selected literature, an overview has been made which articles provide data on each of the concepts for the SLR. This overview is attached in Table 2.2. Additional sources have been used to substantiate and reinforce the SLR. The sections following Table 2.2 subsequently describe the literature perspective on the academic entrepreneur, entrepreneurial career paths of academics, and at last the context and personal motivations of academic entrepreneurship.

Table 2.2 – Overview of SLR articles

Article	Topic: Academic entrepreneur	Topic: Entrepreneurial career paths of academics	Topic: Motivations and context of (academic) entrepreneurship
Algieri et al. (2013)			X
Balven et al. (2018)	X		X
Canits et al. (2019)	X		
Civera et al. (2020)			X
Cohen et al. (2020)			X
Criaco et al. (2014)			X
Davey et al. (2016)	X		X
Etzkowitz (2013)			X
Foo et al. (2016)	X		X
Guerrero et al. (2016)			X
Halilem et al. (2017)			X
Hayter (2011)			X
Hayter (2015)	X		X
Hayter et al. (2017)		X	X
Hesse and Sternberg (2017)	X		X
Huang (2018)	X		X
Johnson et al. (2017)	X		
Klofsten et al. (2019)			X
Lamine et al. (2018)	X	X	X
Li et al. (2020)	X		X
Martin et al. (2018)	X		
Meoli and Vismara (2016)		X	X
Miller et al. (2018)	X		
Obschonka et al. (2015)	X		
Obschonka et al. (2019)	X		X
Qian et al. (2018)			X
Seguí-Mas et al. (2018)			X
Siegel and Wright (2015)		X	
Skute (2019)	X		
Viljamaa et al. (2017)		X	

2.3 Entrepreneurial character of academics

In recent years, more attention has been paid to the identity of the academic who is going to become an entrepreneur. For example, the article by Skute (2019) in which a meta overview is made of academic entrepreneurship literature, shows that the number of publications related to academic entrepreneurship is increasing. However, the identity of the academic entrepreneur is only included in 18.1% of all publications between 2008 and 2018. This observation is interesting because several studies have shown that the identity of the academic entrepreneur plays an important role in both the decision-making process and the performance of the start-up (Hayter, 2015; Johnson et al., 2017; Li et al., 2020; Obschonka et al., 2019). This supports the claim of Balven et al. (2018) that focussing on the micro-

level of academic entrepreneurship is important but often neglected. Therefore, attention is paid to the identity of the academic entrepreneur in this research.

It turns out to be difficult to determine the exact identity of the academic entrepreneur. One of the most commonly used operationalizations of identity is the Big Five personality traits, which map out identity profiles based on five aspects (Cobb-Clark & Schurer, 2012). Obschonka et al. (2019) have therefore researched academic entrepreneurs and tried to map their identity according to the Big Five. However, this research has failed to generate statistically significant results. Also, no other articles have been found that do provide a complete identity profile of an academic entrepreneur. This raises the question of what distinguishes academic entrepreneurs from other academics.

First of all, it is striking that the literature pays attention to the background. Naturally, all academic entrepreneurs have a background as a teacher and/or researcher in an educational institution. Both Huang (2018) and Hayter et al. (2017) have found evidence that the characteristics of the academic background influence the need to become an entrepreneur. The background is operationalized by factors such as academic status, teaching years, number of publications, and managerial position in the institution. Both articles confirm that academic entrepreneurs usually have a lot of experience and an extensive background as operationalized above. This effect can be explained in two ways. One way is that academics with more experience take the step more quickly to become entrepreneurs and that the need for this, therefore, comes with the years (Huang, 2018; Obschonka et al., 2015). The other explanation is that academic entrepreneurs are more motivated and work from both academic and entrepreneurial passion. This explains, for example, faster academic status, management positions, and more publications (Foo et al., 2016; Hayter, 2015; Hayter et al., 2017; Johnson et al., 2017). Of course, a combination of these two causes is also possible.

Thereafter, background and passion will be explored further. In the introduction, it was already discussed that passion is a concept that is receiving increasing attention in entrepreneurship research. Passion for entrepreneurship is shaped by the identity of the entrepreneur. According to Obschonka et al. (2019) *“passion is ‘at the heart’ of entrepreneurship because thinking and acting entrepreneurially arguably requires a strong passion that fuels the personal agency, proactivity, creativity, risk-taking, aspiration, resilience, and persistence”* (p. 1). The research of Obschonka et al. (2019) confirms the role of entrepreneurial passion in academic entrepreneurship as one of the drivers. Balven et al. (2018) also concluded that when the identity of academics is strongly entrepreneurial, they are more inclined to commercialize the knowledge created using their start-up. The origins of entrepreneurial passion can come from many sides in the background of the academic. For example, it appears that if the parents of an academic were entrepreneurs, they are more often passionate about becoming an entrepreneur themselves (Foo et al., 2016). The previous work experience is also mentioned, as is the culture towards entrepreneurship in the educational institution where the academic works (Hesse & Sternberg, 2017; Li et al., 2020). It can therefore be concluded that academic entrepreneurs are passionate and motivated towards entrepreneurship. These characteristics are linked to promotion focus by both Johnson et al. (2017) and Foo et al. (2016). Promotion focus is oriented toward achieving a situation where the individual is concentrated on goal achievement and an idealized self-version (Foo et al., 2016). These aforementioned characteristics distinguish academic entrepreneurs from regular academics.

However, there are also differences between regular entrepreneurs and academic entrepreneurs, who therefore have a background at an educational institution. An interesting difference that also relates to motivation and working carefully has to do with ADHD. This is because Verheul et al. (2016) have researched the relationship between symptoms of ADHD and entrepreneurs. AD is attention-deficit and H stands for hyperactivity, so ADHD is the attention-deficit hyperactivity disorder. This research among entrepreneurs found a significant negative relationship between entrepreneurs and attention-deficit symptoms and a significant positive relationship between entrepreneurs and hyperactivity symptoms.

The research has been repeated by Canits et al. (2019), but specifically for academic entrepreneurs. Here, too, a significant negative relationship has been found with attention deficit, but in contrast to the research by Verheul et al. (2016), there is no relationship with hyperactivity symptoms. This means that academics who score lower on symptoms of attention-deficit are more likely to become academic entrepreneurs and that the degree of hyperactivity is not statistically relevant. This is explained by the fact that the academic entrepreneur is a specific type of entrepreneur because he has chosen to work in an educational institution. The research explains that this is a job with generally a lot of autonomy in the workplace, so it is not preferred for people with a higher relationship with hyperactivity symptoms (Canits et al., 2019).

From this introductory description of the academic entrepreneur, it appears that because they have been an academic as well as an entrepreneur, there are many similarities with regular academics and entrepreneurs. However, some differences and challenges come with that career path. For example, not all knowledge created is suitable for commercialization. Also, it appears that relatively speaking, more (successful) companies emerge from academic entrepreneurship from universities of applied sciences than universities (Davey et al., 2016; Obschonka et al., 2015, 2019). In addition, academics often have a lot of knowledge of their field, but this does not mean that they also understand entrepreneurship and management (Hayter, 2015; Hesse & Sternberg, 2017).

The next subsection deals with the entrepreneurial attitude of the academic and how this can be expressed within and outside the knowledge institution.

2.3.1 Entrepreneurial behavior of academics

When someone displays entrepreneurial behavior, it does not mean that person is also an entrepreneur. In other words, there are employees of knowledge institutions who do show entrepreneurial behavior but do not consider starting their start-up. Academics can be seen as entrepreneurial for *“any activity that occurs beyond the traditional roles of teaching and research, is innovative, carries an element of risk, and leads (in)directly to financial rewards for the individual academic or his/her institution”* (Foo et al., 2016, p. 214). This definition is broad, and it is not necessary to become an entrepreneur to meet it. According to Martin et al. (2018), academics can be classified on a scale from low to high entrepreneurial behavior. This research also shows that academics do not necessarily have to be an entrepreneur to score high on entrepreneurial behavior. Examples are also mentioned such as initiating new internal and external collaborations, exploring and obtaining subsidy forms, and developing new education or research projects (Johnson et al., 2017; Martin et al., 2018). Given that the academics who set up a company are central in this thesis the literature review of Miller et al. (2018) has been applied to make this distinction. Here the dichotomy in the literature regarding whether to start your own business by academics with an entrepreneurial attitude has been set out. Two different terms are introduced for this, namely: entrepreneurial academic and academic entrepreneur.

The distinction between them is essential. The entrepreneurial academic and academic entrepreneur both display entrepreneurial behavior. However, the difference is in how this is expressed. The entrepreneurial academic displays entrepreneurial behavior within the organization and develops initiatives as described above but does not have the motivation to do business outside the educational institution. On the other hand, the academic entrepreneur also displays entrepreneurial behavior but does need to continue this outside the educational institution (Miller, Alexander, et al., 2018). As this thesis focuses on the latter, the academic entrepreneur is relevant.

2.3.2 Sub-conclusion

In conclusion, three types of academics can be distinguished regarding entrepreneurship, these are non-entrepreneurials, entrepreneurial academics, and academic entrepreneurs. Table 2.3 has concise definitions to understand the distinction between them. The focus of this research is on the academic entrepreneur.

Table 2.3 Types of academics

Concept	Definition
Non-entrepreneurial	Do not exhibit entrepreneurial behavior.
Entrepreneurial academic	Shows entrepreneurial behavior within the educational institution but does not tend to become an entrepreneur.
Academic entrepreneur	Does display entrepreneurial behavior and tends to become an entrepreneur.

To eventually arrive at a theoretical model for academic entrepreneurship, the Shane et al. (2003) model for entrepreneurial motivation, which can be found in Figure 2.1, has been updated. The newly added blocks can be recognized in light gray in this Figure. The concepts from Table 2.3 have been added and this leads to Figure 2.3. As a result, the Figure now starts with employees of knowledge institutions and leads to the three types of academic as reported in Table 2.3, namely: non-entrepreneurials, entrepreneurial academics, and academic entrepreneurs. The relationship between academic entrepreneurs and entrepreneurship as careers has been established based on the theory discussed above. Of course, it is also possible that the appropriate time is not yet there and the academic entrepreneur at some point remains academic. The non-entrepreneurial and entrepreneurial academic both do not tend to become entrepreneurs. Therefore, since this model is connected to academic entrepreneurship, their career path is to remain academic.

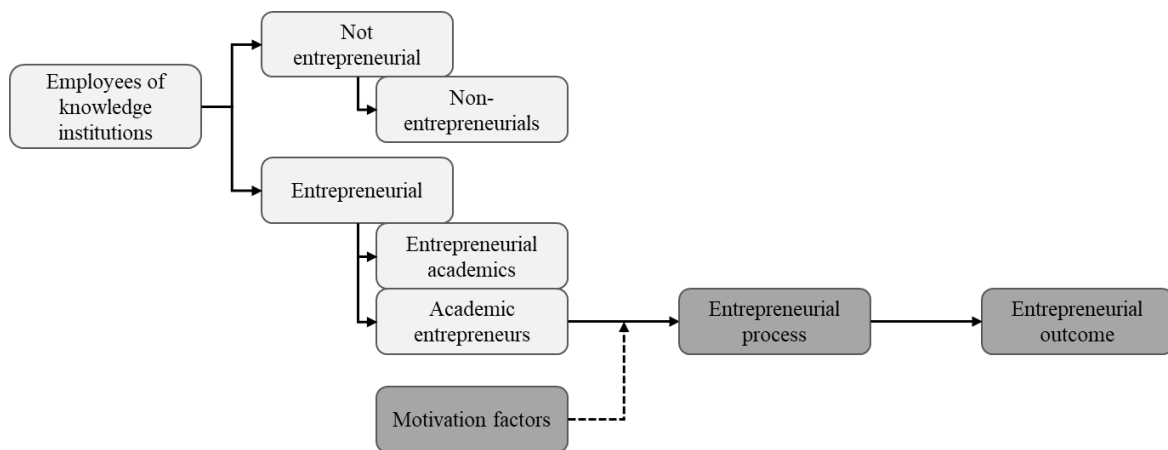


Figure 2.3 Model of academic entrepreneurship with character

2.4 Entrepreneurial career paths of academics

In the previous section, it has already been pointed out that academic entrepreneurs have two possible career paths. Namely to become an entrepreneur and not to become an entrepreneur. However, the literature shows that these are the two extremes and that a middle way is also possible. In that case, it is referred to as hybrid entrepreneurship (Meoli & Vismara, 2016). In academic entrepreneurship, hybrid means that the academic initiates a start-up and works on it part-time while remaining employed at the institution as an academic. This alternate option to full-time entrepreneurship is further explained in the next subsection.

2.4.1 Hybrids

A clear definition of the hybrid entrepreneur is “*individuals who mix entrepreneurship and wage employment*” (Viljamaa et al., 2017, p. 441). In the case of academic entrepreneurship, this wage employment is linked to the knowledge institution, while the academic has his own business. According to Meoli and Vismara (2016), this decision has more consequences than just the number of hours an academic put into the newly established company. Continuing to work for the knowledge institution has complications for both the existing work at the knowledge institution and at the company (Lamine et al., 2018; Meoli & Vismara, 2016; Viljamaa et al., 2017). This means that hybrid entrepreneurs have a different motivation to start a company than those who become full-time entrepreneurs (Meoli & Vismara, 2016).

A possible reason for choosing hybrid entrepreneurship is cited in the Hayter et al. (2017) study. When students develop new knowledge under the supervision of the academic and start a start-up with this, this has a possible interest for the academic. If this interest is compelling enough, he can then participate part-time in the established company (Hayter et al., 2017). In addition, academics are not by definition entrepreneurs. They have a lot of knowledge in their field, and they are also interested in that, which is why they chose to work for a knowledge institution. This does not change because the opportunity arises to start up a business. If the academic does not think it worth quitting his current work for it, hybrid entrepreneurship is a possible solution. (Lamine et al., 2018; Meoli & Vismara, 2016).

2.4.2 Sub-conclusion

In conclusion, three types of career paths can be distinguished regarding entrepreneurship, these are remaining academic, becoming a full-time entrepreneur, and becoming a hybrid entrepreneur. Table 2.4 has concise definitions to understand the distinction between them. The research will clearly distinguish between these two groups, as explained further in Chapter 3.

Table 2.4 Types of career paths

Concept	Definition
Remain academic	The academics that did not (yet) commence an entrepreneurial process and therefore remain working as an academic.
Fulltime entrepreneur	Academics that became entrepreneur, have this as their full-time profession and have quit their job as academic.
Hybrid entrepreneur	Academics that became entrepreneur but did not stop working for the institution. Therefore, they are partially academic and partially entrepreneurs.

The possible career paths, which form the second part of the Shane et al. (2003) model of entrepreneurial motivation, are described based on theory. These have been added to the diagram in Figure 2.3, which leads to Figure 2.4. It can be seen that the career paths remain academic, hybrid entrepreneur, and full-time entrepreneur have been added. To make the changes recognizable, the new information from this section is shown in light gray blocks in figure 2.4. The relationships between the non-entrepreneurial and entrepreneurial academics have not changed since staying as an academic was already part of the model. A branch has been added for academic entrepreneurs who do become entrepreneurs. These are the two possible career paths, full-time entrepreneur, and hybrid entrepreneur.

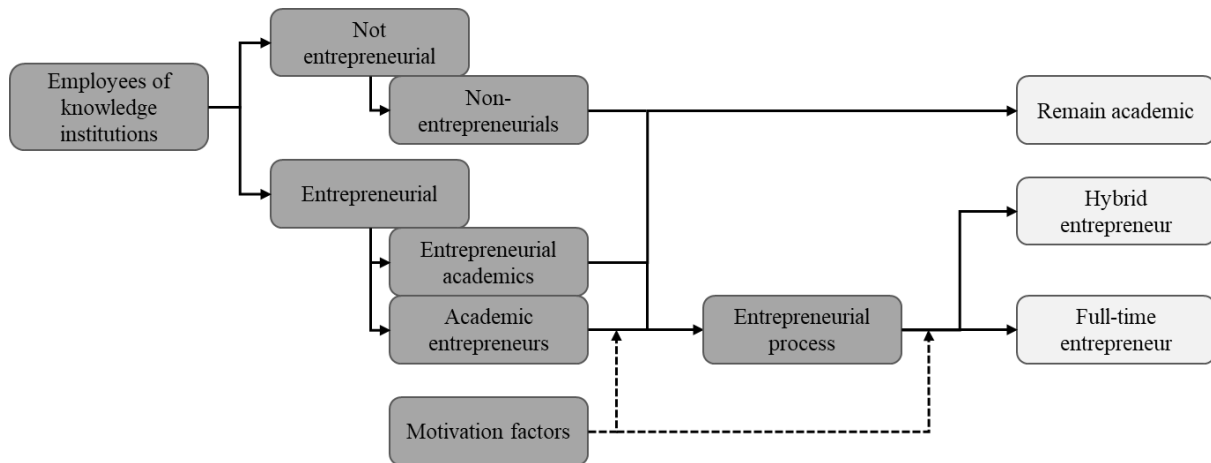


Figure 2.4 Model of academic entrepreneurship with career path

2.5 Context and personal motivations for entrepreneurship

The last part of the theoretical research concerns the context and motivational factors that form the core of the research. The aim of this is to understand the context and motivational factors on which the interview questions can be based. First, the context will be discussed, and then the motivation.

2.5.1 Context of entrepreneurship

The context of entrepreneurship consists of drivers and barriers that together form the direct environment of the academic entrepreneur (Davey et al., 2016). Context is not a constant and will differ per situation, for example, a different field, another country or even a different region can cause the context factors to differ (Cohen et al., 2020; Davey et al., 2016). It is important to consider the context when researching motivation for entrepreneurship. According to Davey et al. (2016) “*The allocation of individuals resources to the exploitation of new opportunities cannot be considered in isolation of the broader context in which such opportunity takes place*” (p. 1477). The academic entrepreneur must be able to deal efficiently with the drivers from the context and on the other hand, needs the ability to overcome constraints and barriers. To bring order to the broad number of context factors discussed in the SLR literature, categorization has been applied, which has been adapted from Seguí-Mas et al. (2018). These categories are the context of the institution, environment, and personal and will be discussed separately below. This categorization of context factors is similarly applied by Criaco et al. (2014) where it has also been found to be comprehensive. Finally, Li et al. (2020) also use this categorization in their research in which a distinction is made between the environmental level, organizational/institutional level, and individual level. In terms of content, this corresponds to the categorization based on Criaco et al. (2014) and Seguí-Mas et al. (2018).

First of all, the institutional context, which refers to the context from the University or the University of Applied Science where the academic is employed (Seguí-Mas et al., 2018). These institutions have an essential role when academic entrepreneurship is concerned (Foo et al., 2016). In order to respond to this, many institutions adopt an entrepreneurial attitude, as they are aware of what role they have to fulfill in society and what this will be in the future. As a result, institutions often have entrepreneurial segments in their mission and vision (Balven et al., 2018; Miller, Alexander, et al., 2018). TTOs have been established for the practical feasibility of this. One of the main tasks of these

TTOs is to support the academic entrepreneur and provide a simple and streamlined process to get from idea to commercialized product. The TTO supports in terms of guiding and coaching the academic entrepreneur and acting as a point of contact within the knowledge institution (Civera et al., 2020). Balven et al. (2018) add that a TTO has the vital role of connecting the employee of the institution with stakeholders both inside and outside the institution. Another important task that the institutions have assigned to the TTOs is already clearly in the name 'Technology Transfer Office', namely the transfer of knowledge or intellectual property from the knowledge institution to the start-up (Meoli & Vismara, 2016). Employees of knowledge institutions are often legally and contractually bound to the TTO to be able to take over knowledge (Balven et al., 2018). Much research has been done into the effect of TTOs on the number of start-ups and their success. For example, Meoli and Vismara (2016) conclude that stronger administrative support for the academic entrepreneur has a U-shaped effect on the number of established start-ups, which means that a good balance is essential. In addition, Algieri et al. (2013) found a significant positive relationship between the number of TTO employees and the number of start-ups. However, not everyone argues that the TTOs promote entrepreneurship. According to Hayter (2011), TTOs are increasingly faced with strategic goals and benchmarks imposed by the institution. This creates conflicting interests, for example, because the TTO suddenly has an interest in pushing through the start-up as quickly as possible or because financial interests arise. Research by Balven et al. (2018) shows that this even leads to the fact that 42% of the potential academic entrepreneurs have at least once consciously tried to circumvent the TTO and thus the institution when it comes to technology or IP transfer. Guerrero et al. (2016) add that as a result, institutions face many different types of challenges that can lead to different strategies towards academic entrepreneurship. Civera et al. (2020) respond to this by indicating that policy around TTOs should be focused on rationality and should therefore focus on the individual, the academic entrepreneur.

Second, the environmental context concerns the barriers and drivers in the direct environment of academic entrepreneurship except for the institution itself (Criaco et al., 2014; Li et al., 2020; Seguí-Mas et al., 2018). The composition and influence of the environmental context depends on many factors and is therefore not a constant. These influencing factors may first and foremost be the academic entrepreneur's field, country, or even geographic region. However, it can still differ per situation, for example, whether an external partner claims the IP from the research, whether government agencies are involved and what the role of supporting organizations is. (Criaco et al., 2014; Foo et al., 2016; Halilem et al., 2017; Meoli & Vismara, 2016; Seguí-Mas et al., 2018). According to Halilem et al. (2017), it is difficult to give a general picture of the environmental context because it is situation-dependent. Studies that have tried to get a picture of this, such as Criaco et al. (2014) and Seguí-Mas et al. (2018), also add this as a point of consideration. That is why there are known factors that can emerge, but there is no fixed picture of what the academic entrepreneur will have to deal with available in the literature.

Third and last, there is the personal context of the academic entrepreneur. According to Seguí-Mas et al. (2018), this consists of the personality and motivation of the academic entrepreneur himself. The personality of the academic entrepreneur has already been described in section 2.3 and will therefore not be discussed again here. The other part of the personal context, motivation, together with the context, forms the core of the research. That is why the next paragraph will be completely devoted to motivation factors.

2.5.2 Motivation

The motivation of academic entrepreneurship will in this research be defined as the motives of academics to either do or do not engage in entrepreneurship. These motives are important because these are the aspects where the academics make their decisions, this is important because “*decision making*

lies at the heart of academic entrepreneurship” (Li et al., 2020, p. 1). In the research of Hesse and Sternberg (2017), motivational factors are defined as the underlying reasons on which the person identified as the academic entrepreneur bases his decisions. Many different articles have been found in the SLR that discuss motivational factors, for example, Hayter (2011, 2015), Hayter et al. (2017), Huang (2018), Lamine et al. (2018), and Obschonka et al. (2019). To structure this, the study of Cohen et al. (2020) was used, in which a framework was created to map motivation for entrepreneurship. Four categories appear, namely: career advancement, salary, contribution to society, and intellectual challenge. These categories, except salary, correspond to the picture that emerges in the rest of the articles on motivation. The salary category has been adjusted because it is too narrowly oriented from Cohen et al. (2020) when compared to articles such as Hayter (2015) and Qian et al. (2018) that also include risk and investment instead of only income in the form of salary. For the category of motivation that has to do with financial aspects, the term 'financial' will be used instead of the category 'salary'. Herefore, the four categories for motivation factors are career advancement, financial, contribution to society, and intellectual challenge. These will be explained in detail in the following paragraphs.

Within the first category, career advancement, various aspects are discussed in the literature. The career of the academic who is an entrepreneur is drastically changed by this decision. Through the work as an entrepreneur, experiences are gained that the academic does not have, which is an addition to the career (Cohen et al., 2020). According to Hayter et al. (2017), this means that, for example, growth ambitions in the career of the academic entrepreneur can be fulfilled. The research of Hayter (2015) already shows that the entrepreneurial experience is an enrichment for the career of the academic entrepreneur and that it entails a form of seniority. This addition to the career also provides a part of peer recognition, which makes the academic entrepreneur radiate authority (Hayter, 2011). Huang (2018) further points out that especially the learning that comes with the entrepreneurial experience and the commercialization of technology can make a difference in the career of the academic entrepreneur.

As discussed, the second category, financial, is formulated more broadly than just the salary aspect as defined by Cohen et al. (2020). The research of Hayter (2011) indicates that entrepreneurs are primarily motivated by money. However, some studies include other aspects in the financial field. It turns out that when an academic entrepreneur takes over a certain technology from the knowledge institution, its value is still quite low. This is followed by a long process to eventually get a saleable product. This requires investments of both time and money. During this period, the start-up does not receive any money, but there are costs, for example for product development. The fact that the technology needs to be further developed therefore entails financial motivations for academic entrepreneurship (Qian et al., 2018). This is confirmed by Hayter (2015), who emphasizes the combination of financial gain but also financial restraining factors. Finally, the certainty of a stable financial situation also plays a role in the motivations for starting or not starting a start-up (Hesse & Sternberg, 2017).

Thirdly, the contribution to society plays a role as motivation to become an entrepreneur (Cohen et al., 2020). For this, various aspects are discussed in the accompanying literature. For example, a contribution can be made with the technology that is brought onto the market, as it often improves a certain situation (Obschonka et al., 2019). Establishing and expanding a company also involves several social aspects, such as employing staff which leads to (regional) job creation. It is also discussed that such companies that are founded by academic entrepreneurs often contribute to environmental aspects (Hayter, 2011; Hayter et al., 2017). Finally, academic entrepreneurs, often have the need to help students, for example, to find a job or become entrepreneurs themselves (Hayter, 2015).

The fourth and final category that includes motivational factors is in the field of intellectual challenge (Cohen et al., 2020). Academic entrepreneurs see a challenge as an incentive, and this motivates them to continue in the entrepreneurial process. Because the academic entrepreneur has to develop a product further than is usually done within the knowledge institution (Etzkowitz, 2013; Li et al., 2020). This poses a challenge in the field of technology dissemination and technology development (Hayter, 2015). In addition, as entrepreneurs, they have variety by also having to work in other fields such as marketing, finance, and strategy. This variety of work increases the intellectual challenge to which the academic entrepreneur is sensitive according to Cohen et al. (2020).

2.5.3 Sub-conclusion

Building on the research of Cohen et al. (2020), Criaco et al. (2014), and Seguí-Mas et al. (2018), an overview has been created of categories for context factors and motivation factors. These categories are all clearly and schematically shown in Figure 2.5.

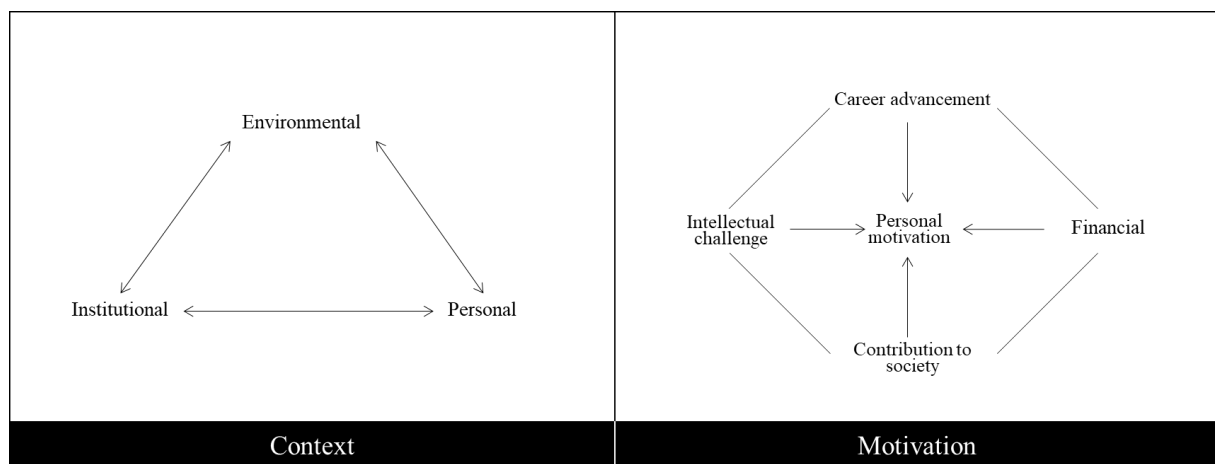


Figure 2.5 – Overview context and motivation

Table 2.5 provides the categories of context factors and a definition. The same has been done for categories of motivational factors in Table 2.6. These terms and definitions will be used in the next section as input to complete the theoretical framework of academic entrepreneurship for the research.

Table 2.5 – Types of entrepreneurial context

Concept	Definition
Institutional context	Drivers and barriers that come forward from the University or the University of Applied Science by which the academic entrepreneur is employed.
Environmental context	Drivers and barriers that come forward from the direct environment of the academic entrepreneur but are outside of the institution.
Personal context	Drivers and barriers that come forward from the academic entrepreneur himself and are from both personality and motivation.

Table 2.6 – Types of entrepreneurial motivations

Concept	Definition
Career advancement	Motives that have an impact on the career of the academic entrepreneur and its development.
Financial	Motives that have an impact on the overall financial situation of the academic entrepreneur.
Contribution to society	Motives that have an impact the professional contribution to society, for example in the social or environmental field.
Intellectual challenge	Motives that have an impact on the way the academic entrepreneur is challenged on an intellectual level.

2.6 Theoretical framework

To complete the SLR, the categories for context factors and the categories for motivation factors as described in Table 2.5 and Table 2.6 have been added to the progressively updated model of Shane et al. (2003). The newly added motivation and context categories correspond to the concepts in the tables and are indicated in light gray for traceability. The result is therefore visible in Figure 2.6, the theoretical framework of academic entrepreneurship. This theoretical framework starts with the employees of knowledge institutions and ends with one of the three identified career paths: remaining academic, hybrid entrepreneur, and full-time entrepreneur. In between lies possibly an entrepreneurial process and the decision moments (branches) on which the context and motivation have an influence. The theoretical framework is the basis for the practical part of this research. How theory and practice will be exactly linked from the theoretical framework will be explained in the next chapter about the methods.

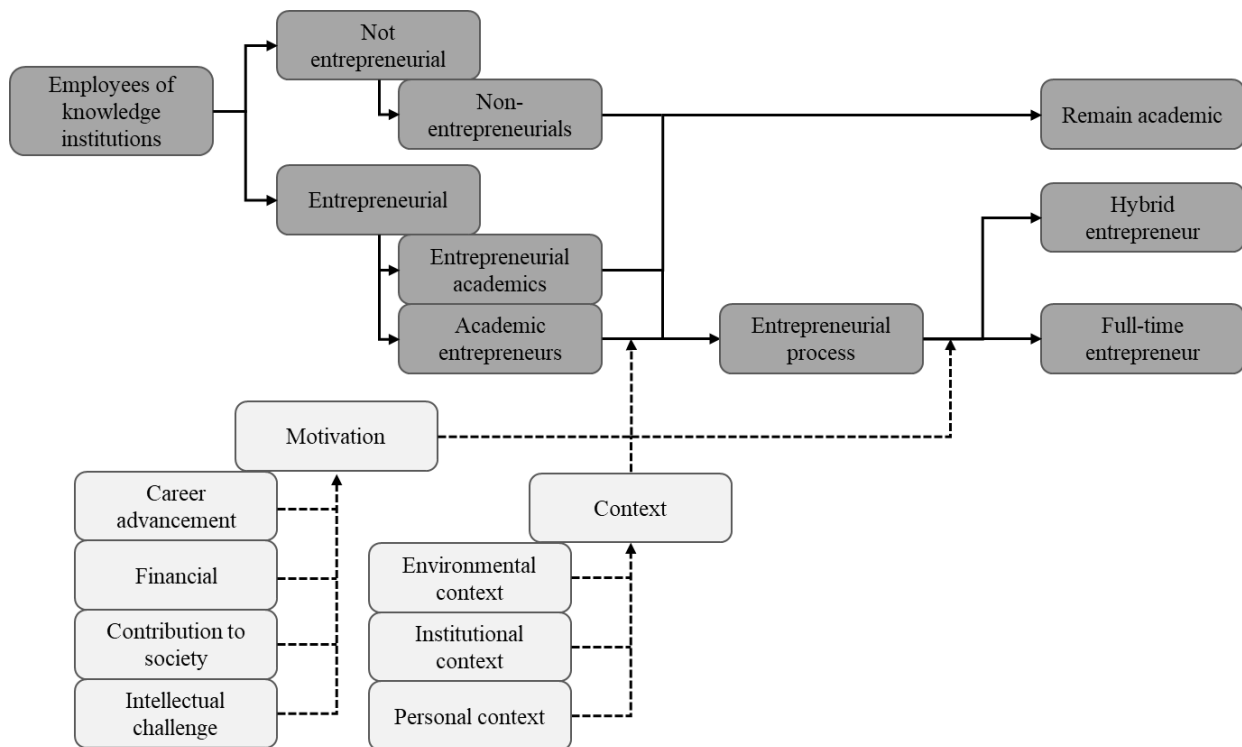


Figure 2.6 Theoretical framework of academic entrepreneurship

3. Method

In this chapter, the methodology of the research will be discussed. This is relevant for understanding the performed research, not only content-wise but also in terms of reliability and validity. Besides, this method chapter serves to guarantee reproducibility. Section 3.1 describes the general research design. Followed by the data collection, which contains the sampling method, interview method, and interview outlines, in section 3.2. In section 3.3, the data analysis will be discussed, which is about the transcribing, coding, and analysis of the coding outcomes.

3.1 Research design

This research is qualitative, which makes it possible to ask questions and discover underlying motives. The character of this qualitative research is exploratory. This means it was not sure beforehand which results would be found and which direction the research would go. The main goal was to gain knowledge about personal motivations for engaging in academic entrepreneurship and use the research to explore the research area for further research. As mentioned in the introduction, the results of this research can be used by universities and governments to investigate suitable incentives or legislation and for example influence academics by leadership.

The research design of the practical part of this research can be found at the bottom of the theoretical framework (section 2.6). The research methodology elaborated in this chapter is based on the model shown in Figure 3.1. This Figure shows a short version of what the research area is to answer the relevant sub-questions and the MRQ. The main focus is on motivation and context which are marked in green. Below Figure 3.1, further explanation of the research area is provided.

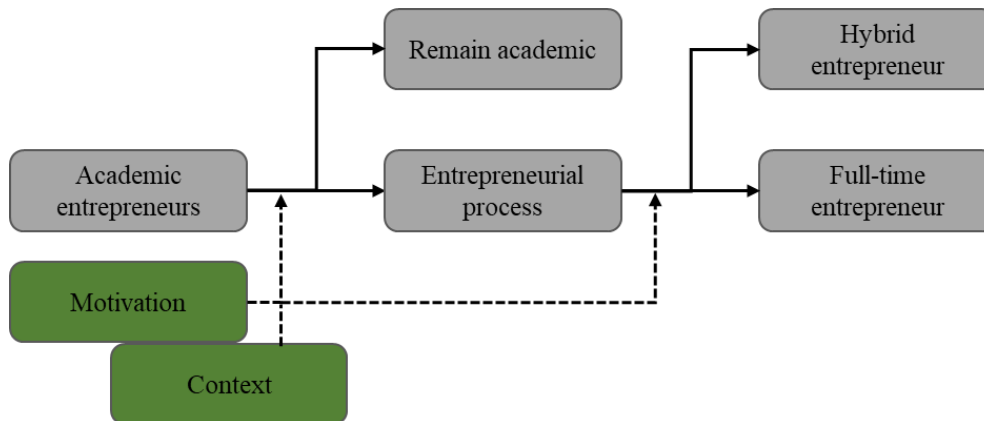


Figure 3.1 Research area

As became clear in chapter 2, the focus is on the employees of knowledge institutions who can be described as an academic entrepreneur based on personality. The core of the research consisted of examining the personal motivations that have an impact on the decision to start an entrepreneurial process or not. The possible outcomes (remain academic, hybrid entrepreneur, and full-time entrepreneur), as well as the context (drivers and barriers), were also included in this. These personal motivations are based on the lower part of the theoretical framework and the theoretically determined categories.

3.2 Data collection

For this research, semi-structured interviews were conducted. The interviews have been conducted in either Dutch or English, dependent on the preference of the respondent. There are pre-defined sets of questions, which are discussed below. However, the semi-structured nature of the interviews did make it possible to discover underlying motives and also to discover aspects that have not been discussed in the theory.

Before the sampling method will be introduced, first the selection requirements will be discussed. Several requirements are used for the selection of respondents to make sure the respondents are within the scope of the research. These requirements are:

- The respondent is academic, entrepreneur, or hybrid at the moment of the interview.
- Regardless of the current career, the respondent used to be a teacher or researcher at a knowledge institution.
- The respondent's career is within the field of technology.
- The respondent's career is in the Netherlands.

Anyone who fulfilled the above conditions was eligible to participate as a respondent in this research. For selecting the respondents, the convenience sampling method was used. Convenience sampling is a nonprobability sampling method. As a result, respondents can be collected in this method through the use of networks and connections of those involved (Etikan et al., 2016). Part of the choice for convenience sampling is the Covid-19 pandemic that is going on during the execution of this research. The risk of convenience sampling as a non-probability method is that the population is not properly represented, which results in the research being invalid (Farrokhi & Mahmoudi-Hamidabad, 2012). To prevent this, two aspects have been important while selecting and approaching respondents. First of all, a respondent had to meet all four respondent criteria described above. Second, the three possible career paths will be equally represented in the sample, with a maximum deviation of $n=1$. The number of interviews per respondent category that are conducted is shown in Table 3.1. By ensuring these two aspects, all respondents are part of the population. In addition, the personal motivations of each respondent category will be of equal reliability by continuing to balance these amounts of interviews while selecting respondents. The respondents ultimately selected work at the following Dutch knowledge institutions:

- Aeres University of Applied Sciences
- Saxion University of Applied Sciences
- Tilburg University
- University of Applied Sciences Inholland
- University of Twente

Table 3.1 – Overview number of interviews for each respondent category

Respondent category	Number of interviews
Academics	3
Hybrids	4
Fulltime entrepreneur	3

The interviews are conducted digitally using Microsoft Teams due to the applicable Covid-19 restriction. Using the built-in function of Microsoft Teams, an audio recording has been made of the interviews. The first step in conducting the interviews was therefore to ask for this permission. The predefined questions are divided into four sets, named A, B, C, and D. Set A contains general questions, including several questions to make the distinction between the career paths to determine which subsets of sets B and C are applicable. Set B and C are based on the categories derived from theory in section 2.5 and consist of different subsets for the different career paths that are possible according to the theory chapter (remain academic, hybrid, or full-time entrepreneur). The last set of questions, set D, contains reflection questions and formalities for closing the interview. Table 3.2 shows the definition of each subset and Table 3.3 represents which sets and subsets are applicable for each of the possible career paths. The list of questions for each subset can be found in Appendix 1.

Table 3.2 – Definition of question sets

Set	Definition
Set A	Introduction, general questions, and determining the career path
Set B-1	Understanding the personal motivations and context for remaining academic
Set B-2	Understanding the personal motivations for commencing an entrepreneurial process
Set C-1	Understanding the personal motivations and context for becoming a full-time entrepreneur
Set C-2	Understanding the personal motivations and context for becoming hybrid
Set D	Reflection question and closure of the interview

Table 3.3 – Question sets for the respondent's career path

	Remain academic	Fulltime entrepreneur	Hybrid
1 st set	Set A	Set A	Set A
2 nd set	Set B-1	Set B-2	Set B-2
3 rd set	Set D	Set C-1	Set C-2
4 th set	-	Set D	Set D

3.3 Data analyses

After the interviews were conducted, these are first transcribed based on clean verbatim transcription. Clean verbatim, in contradiction to smooth or even full verbatim, excludes details like filler words and silences (McLellan et al., 2003). This is sufficient for this research since filler words and silences are no added value for answering the MRQ. The interviews are transcribed using the online program Amberscript. This is a web-based program that automatically converts speech to text. After this conversion is complete, the researcher had to check the conversion and complete and correct the transcript based on the recording, so valid transcripts remained. In interview question set D (see Table 3.2 and Appendix 1), respondents were asked if they want to validate the transcript to ensure accuracy. If the respondent has indicated that he wishes to do this before the interview is used in the research, the transcript has been sent to the respondent. After approval, the transcript is used in the data analyses.

Then the transcripts are coded in three steps. Namely deductive coding, inductive coding, and axial coding. The first step is deductive coding. Figure 3.1 provides a schematic representation of the deductive coding process. Deductive coding works from a theoretical perspective. In this research, this is the theoretical framework with the corresponding categories for personal motivation. Quotations from the interview have been deductively coded to the corresponding category from the theoretical framework. This leads to a coding result that matches the format of the theory results (Locke et al., 2020).



Figure 3.1 – Deductive coding process

The second step was the inductive coding of the interviews. In this step subjects that are not included in the theory could be included in the research. This also absorbs missed content from the SLR along with topics that did not yet appear in the theory. Figure 3.2 provides a schematic representation of the inductive coding process. In contrast to deductive coding, inductive coding did not start with the theory but with the collected data. This included the quotations that contributed to answering the MRQ but were not addressed in the deductive coding during the first step. The quotations have been inductively coded which leads to the inductive coding result (Locke et al., 2020). This step was included in order to not to ignore relevant data.



Figure 3.2 – Inductive coding process

For the full picture, the deductive coding results are combined with the inductive coding results. For this purpose, axial coding has been applied. Figure 3.3 provides a schematic representation of the axial coding process.

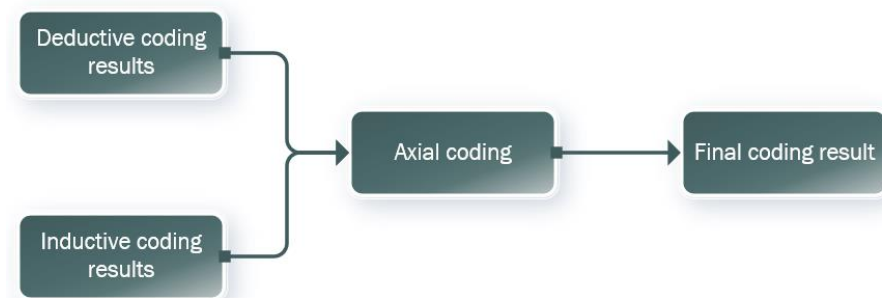


Figure 3.3 – Axial coding process

The coding of transcripts has been performed using the electronic coding program Atlas TI. Using this program has supported the researcher to code in a structured way. The program is capable of supporting deductive, inductive, and axial coding. Therefore, Atlas TI is suitable to apply in this research.

4. Results

The results chapter has been written based on the coding, as discussed in the previous chapter. First of all, in section 4.1 the context factors for academics, hybrids, and full-time entrepreneurs will be discussed. In addition to the general description of these results, the similarities and differences between the different career paths will also be discussed. The same will then be done for the motivation factors in section 4.2. The complete overview of both the deductive and inductive codes can be found in Appendix 2.

4.1 Context

The deductive coding results for the context have been combined into aggregate clusters to give a clear overview of the factors, which can be found in Table 4.1. These factors are described per category as determined in the theoretical framework on which deductive coding is based. The numbers indicate in how many interviews the factor has emerged. The theoretical framework is comprehensive, as no inductive coding results were found. This means that the context in the context of the research topic consists of institutional, environmental, and personal categorized factors. Below Table 4.1 a discussion of the context will be given, structured by the categories.

Table 4.1 – Clustered coding results for the context

Factor	Academics	Hybrids	Entrepreneurs
Institutional			
<i>Being close to the market</i>		4/4	
<i>Beneficial working climate</i>	2/3	3/4	3/3
<i>Entrepreneurial focus</i>	1/3	2/4	2/3
<i>Entrepreneurship support</i>	2/3	3/4	3/3
<i>Lacking with IP</i>	1/3	4/4	3/3
<i>Slow processing time</i>	3/3	4/4	3/3
<i>Unclear</i>	3/3	3/4	3/3
Environmental			
<i>External partners</i>	2/3	2/4	1/3
<i>Funding</i>		2/4	3/3
<i>Government support</i>	2/3	1/4	2/3
<i>IP involvement</i>		2/4	1/3
Personal			
<i>Entrepreneurial behavior</i>	3/3	4/4	3/3
<i>No entrepreneurial expertise</i>	3/3	3/4	2/3
<i>Motivation factors</i>	3/3	4/4	3/3

Institutional context

The first institutional factor that emerged during the interviews is that institutions have a certain focus on entrepreneurship. For example, it appears that institutions often refer to entrepreneurship in their mission and vision statements. This is both within the framework of an entrepreneurial university or university of applied sciences and to promote actual entrepreneuring outside of the institution. Respondents indicate that, in their view, this has to do with the fact that the objective of a knowledge institution is not only to create knowledge but also to share it. Even though it is primary knowledge sharing towards students, sharing knowledge towards the market also plays a role in this. However,

according to many of the respondents, at the knowledge institution, it is only goals and implementation often leaves much to be desired. As one of the respondents stated:

“We want to create and share knowledge, this is the policy of the university of applied sciences, that is not always possible yet, it can really benefit from an improvement.”

This brings up the second factor, namely: entrepreneurship support. Both the respondents that remained academic and become full-time or hybrid entrepreneurs criticized how the knowledge institution deals with the entrepreneurial ambition of employees. They indicate that there is little facilitation, there is a lot of uncertainty, and that everything takes an unnecessarily long time. On the other hand, more attention is slowly being paid to academic entrepreneurship and the accompanying support is currently being developed further within knowledge institutions. Despite that entrepreneurship support is developing, institutions are still a limiting factor. One of the respondents who still works for the knowledge institution stated the reason for this: *“The biggest barrier to becoming an entrepreneur from the university is currently the university itself.”* The main argument put forward for this is the lack of clarity. Among the group of respondents who are still academics, there is uncertainty about where to start. It is mentioned that it is not clear who is responsible for the transfer of knowledge or support for entrepreneurship. Within this group of respondents, it was even said: *“I would not even know where to start.”* This lack of clarity also plays a role in the group of hybrid entrepreneurs. An additional problem for people is that they are still connected to the knowledge institution due to their hybrid form. It is unclear what is and is not allowed within this hybrid form and it is therefore unclear where the boundaries lie between the knowledge institution and the company. This is confirmed by noticeable differences between the hybrid respondents. At the moment, some believe that the knowledge institution and their own company should be strictly separated to prevent them from benefiting twice themselves. However, other respondents indicate that they try to keep the knowledge institution and their own company as closely connected as possible so that the relevance and usefulness of the hybrid form is greater in their opinion. This is an interesting factor in particular for hybrids because this form implies that they are bound to both the institution and the company they have set up for the longer term. In other words, it lacks clear guidelines. One hybrid respondent stated:

“I have already made a lot of effort with several people within the knowledge institution to gain clarity about what is and is not acceptable. I think it is not only in my interest but also in the interest of the university of applied sciences. However, it is not possible to get anything on paper till this far.”

Subsequently, the processing time required by the knowledge institution in this process is also frequently mentioned as a limiting factor. Logically, this is due to the lack of clarity that prevails within both the knowledge institution and the academic entrepreneurs themselves. This is particularly evident in the process of knowledge or intellectual property (IP) transfer. Given the scope of this research in the field of technology, many respondents indicated that they want to operate on the market rapidly. Waiting for a long time can lead to the competition overtaking you. That is why frustration was expressed about the lengthy process that the IP transfer entailed from the knowledge institution. In addition to taking a long time, the IP process is also described as inefficient and even unfair for the academic entrepreneur. Many different reasons are given for this. First of all, there is a lot of bureaucracy which makes the process complicated and lengthy. Secondly, the aforementioned lack of clarity plays a role in this. Finally, the knowledge institution not only has an interest in sharing the knowledge, but they also have a financial interest. This two-sided importance is also why the academic entrepreneurs regard the position of the institution as unfair according to respondents. They indicate that the institution supports them in their entrepreneurial needs based on the importance of sharing knowledge. To do this, they must be open about, among other things, their business plan. However, from a financial point of view, the institution is the party with which you must negotiate about the knowledge or IP transfer, while it is

fully aware of your business plan and goals. It is also indicated that the owner of the knowledge can differ per project and that this is not always just the knowledge institution. This will be discussed in more detail in the next section, environmental context.

In all of the respondent groups, knowledge or IP transfer policy was the main topic while discussing the role of the institution. To indicate the extent of the aforementioned problems, some clear examples of quotations for each of the career paths are given below.

Academics: *“At the current speed, your business case is already off the map before you start, and your market has already been taken over by third parties.”*

“I am considering developing a similar product myself, so that I am not bound by the knowledge transfer from the university.”

Hybrids: *“It took a very long time until the university came to the realization that no interesting scenario was possible for me as an entrepreneur in that way.”*

Entrepreneurs: *“I have to negotiate about the IP with the exact same person that is supporting me with the business.”*

“In the end, I already started the company five months ago, but the IP negotiations are still practically at a standstill at the institution. In other words, I can't produce and sell if I want it yet.”

“It is pure bureaucracy. Everyone gets their turn and has to give an opinion about it.”

Finally, another institutional context factor is suggested that does promote entrepreneurship, namely that the working climate within institutions is suitable for entrepreneurial behavior. This is because respondents notice that they have a lot of freedom in their job as an academic. This is not only freedom in determining their tasks but also the freedom to start new collaborations if they want. This freedom results in a working climate that is very suitable for the run-up to entrepreneurship. When academic entrepreneurship occurs directly based on knowledge from a research project, then the academic has been working on the technology for his own company for quite some time under the name of the institution. These freedoms lead to a certain job diversity that makes some of the respondents from the group that remained academic say that they are currently still satisfied at the institutions because this working place fulfills their needs.

Environmental context

The second context group that will be discussed is the environmental context of the academic entrepreneur. First of all, the process surrounding knowledge or IP transfer is also mentioned here as an influencing factor. This factor is project-dependent and is related to who owns the knowledge created in the project. At universities of applied sciences, in particular, it emerges from the interviews that companies are often involved in research projects and that through their contribution they also (partly) claim the knowledge created. As a result, they own the knowledge and that is why the academic entrepreneur comes into contact with these involved parties. Then the IP must not only be transferred from the knowledge institution but also these companies. The image that is formed based on the interviews about knowledge or IP transfer is generally more positive than about the knowledge institutions. However, there are varying experiences. While some respondents indicated that the companies involved are cooperative and realistic, another respondent has the experience that a company involved wanted to negotiate down to the last cent. These differences are caused by the fact that every company deals with research projects and the knowledge that arises differently. To indicate these differences the following two quotes are included, both from a hybrid entrepreneur.

“At that time, we enjoyed working together and I was able to take over ownership of the technology without any problems. [...] We have agreed to continue working together in the long term, this has been beneficial for me so far.”

“It was viewed purely from a business perspective and in such a way that it was very difficult for me as a researcher and aspiring entrepreneur to convince the company that I also had to keep a good deal and therefore an opportunity.”

In short, just as on the side of the knowledge institution, the transfer also plays a role in the environment. However, there are two essential differences between knowledge and IP transfer about how it is viewed in the environmental context versus the institutional context. First of all, the interviews show that the knowledge institution always influences the knowledge or IP transfer, while the influence from the environment does not always apply. It depends on the project who owns the technology and therefore also who has a claim to the knowledge created. The other difference is that all respondent groups experience this effect at the institution. While only the hybrids and full-time entrepreneurs also describe it in the environment. This indicates that the respondents who currently have remained academics are more focused on the institution and have not yet reached the point of discussing external owners of the knowledge.

What also occurs in the environmental context is the use of existing (research) partners. Because academics regularly deal with companies in their field during their work, they have often built up existing contacts here. When the academic becomes an entrepreneur, he can make use of these contacts in his network. The interviews show that an academic's network can be used for different results. Possibilities mentioned are validating ideas, entering into collaborations, as a (launching) customer, research partners, or for financing reasons. Here the next environmental factor is immediately discussed, namely receiving financing. Respondents indicate that they have experience with subsidies and other forms of financing from their work as academics. As a result, they know which organizations there are in this area and where they can arrange financing if necessary. From their time as academics, they experienced that getting funding is time and labor-intensive. Not only organizations such as companies are mentioned for retrieving funding, but also government agencies. A respondent in the hybrids group indicated *“My experience as a research grant writer has enabled me to arrange a take-off grant for my start-up.”* Next to government grant, multiple respondents indicated that the government has a limited role. In certain fields, the interviews discussed legislation that makes it difficult for small start-ups to keep up to date and comply with it. Finally, given that technology was central to this research, it was also mentioned about governments that there is stimulating policy to, for example, promote digitization or robotization.

When the three groups of respondents are compared, few differences can be observed. It is visible, however, that there are no funding codes for the group that has remained academic. This insinuates that the academic entrepreneur's attention is only drawn to this at a later stage and that there are initially other factors that influence the decision more heavily.

Personal context

As discussed in the theory chapter, the personal context consists of personality and motivation. The next section will fully discuss motivation, so this will be omitted here, also questioning personality was outside the core of the research. However, in question set A (see appendix 1) introductory questions were asked that provide a brief general picture. Clear examples of entrepreneurial behavior were seen in the interviews. The important point to note here is that not everyone sees themselves as an entrepreneur. Respondents indicate that even though they have a lot of knowledge in their field, they do

not have the knowledge and experience to be an entrepreneur. In addition, many respondents also indicate that they have family members who are entrepreneurs themselves. Respondents also indicate that they consider themselves entrepreneurial all their lives, which ties in with the theoretical description of the academic entrepreneur according to Canits et al. (2019), Foo et al. (2016), and Li et al. (2020), among others. Now that the context has been worked out, section 4.2 will present the motivation factors of academic entrepreneurship.

4.2 Motivation

Just as the coding results about the context, the deductive coding results for motivation have also been combined into aggregate clusters to give a clear overview of the factors, which can be found in Table 4.2. These factors are described per category as determined in the theoretical framework on which deductive coding is based. In contrast to the context, the theoretical framework is not complete for the motivation factors. Therefore, there are also inductive coding results next to the deductive coding results. Table 4.2 only includes the aggregate clusters based on the deductive coding results. The numbers indicate in how many interviews the factor has emerged. Below Table 4.2 a discussion of the motivation factors will be given, structured by the categories. After this discussion, the inductive coding results will be presented.

Table 4.2 – Clustered deductive coding results for motivation

Factor	Academics	Hybrids	Entrepreneurs
Career advancement			
<i>Benefit from combination</i>		4/4	
<i>Looking for next step in career</i>	2/3	3/4	3/3
<i>Want diversity of career</i>	2/3	3/4	3/3
Financial			
<i>Financial risk (too) high</i>	2/3		
<i>Financial risk is acceptable</i>		4/4	3/3
<i>Not dependent on start-up income</i>		3/4	
<i>Rational risk considerations</i>	3/3	4/4	3/3
Contribution to society			
<i>Contribute by educating students</i>	2/3	3/4	
<i>Want to help others</i>	3/3	3/4	3/3
<i>Want to solve current problems</i>	3/3	4/4	2/3
Intellectual challenge			
<i>Actually applying knowledge</i>	3/3	2/4	3/3
<i>Job diversity</i>	2/3	3/4	2/3

Career advancement

Within this first category that emerged from the theory research, motivational factors were identified in the interviews for all three groups of respondents. Regardless of whether or not the academic eventually becomes an entrepreneur, the need for a new step in the career plays a role for everyone. It has already been discussed in the institutional context that there is a lot of room there for doing new things internally and carrying out other activities. However, the interviews show that the respondents require a more radical enrichment of their careers. It is also not the case that everyone continues to find the challenge and diversity of work sufficient. Especially from the group of respondents who became full-time entrepreneurs, it is said that the knowledge institution no longer offers sufficient

challenge. Because of the institution not being challenging anymore, the academic entrepreneurs decided to become full-time entrepreneurs. On the contrary, hybrid entrepreneurs said that they do find enough challenge and career enrichment in their work for the institution. This indicates that academic entrepreneurs who still get enough satisfaction and career advancement from working for a knowledge institution are more likely to go for hybrid entrepreneurship. On the other hand, the academic entrepreneurs who no longer experience this at the knowledge institution are more likely to say goodbye to the knowledge institution and start a full-time business. Some good examples about career advancement motivation from the interviews are:

“My work at the university is certainly not monotonous, on the contrary. But sometimes I want something completely different, something that is really new.”

“I don’t only see it as doing something else, it is also a new environment, new people, new goals, new challenges, etc. [...] So, it is more than just doing something else, that is the value of developing my career for me.”

“As a researcher, I also had the opportunity to do new things, but entrepreneurship is quite different from doing a new type of project. Just to talk about diversity, that's already a big difference.”

Finally, another motivating factor for hybrid entrepreneurs has been discovered that does not apply to both full-time entrepreneurs and those who remain academic. It is experiencing the benefits of hybrid entrepreneurship for the career. This effect works both ways. Hybrid entrepreneurs say that they are better entrepreneurs because they still work in a knowledge institution. Conversely, they say that they are a better researcher and/or teacher because they have their own business. Because of their own company, they are closer to the market and gain experience, which allows them to do better research and, for example, give good examples in their lessons. One of the hybrid respondents said, *“I always have the very best examples when teaching, straight from my company”*. Based on this, it can be concluded that the academic entrepreneur who chooses to become a hybrid entrepreneur has one of the motivational factors to advance the career, both for the career as an academic and for the career as an entrepreneur. They thus maintain two careers simultaneously and are therefore able to benefit from the best of two careers.

Financial

In the second category, financial motivation, clear differences were found between the groups of respondents, which are mainly based on risk considerations. First of all, it is striking that the respondents do not allow themselves to be affected by money as a reward from the company. The respondents mainly indicated other motivational factors, in which money does play a role, but it is regarded as a side issue. However, the risks in the financial field are a trade-off that must be made. Because of the differences per respondent group, these will be discussed individually.

First of all, the full-time entrepreneurs, given that relatively speaking they take the most financial risk because they quit their job at the knowledge institution. The respondents indicated that they could take that risk because they are not dependent on their income in the short term. The reason behind this differed per respondent. For example, one respondent indicated that he was still at the beginning of his career and that he had few fixed costs at the moment. On the other hand, there is a respondent who had been working for a long time and who had built up a suitable buffer to be able to go without income for a longer period. Even though several possibilities convince the full-time entrepreneurs to be able to live without income, there is still a risk of losing the income. The respondents

indicate that it is a risk consideration because they believe it is worth the risk in the longer term. It turns out that they are convinced because as a full-time entrepreneur they can pay much more attention to the start-up, which gives it a better chance of becoming successful. One of the respondents who is now a full-time entrepreneur said:

“There are so many aspects to doing business, think of the business plan, financial management, marketing, and so on. Then we haven’t even talked about the actual product development. So, you actually have to do that full-time to be able to tackle everything properly and to pay enough attention to it.”

Then there are the hybrid entrepreneurs, as they are in a special financial situation. Because in addition to setting up a company from which money can be generated, they also remain employed by the knowledge institution. As a result, they are not financially dependent on the start-up. Hybrid respondents indicated that this more limited risk makes it more attractive to do business. There were also differences between the hybrid respondents. For example, some have resigned part-time from the knowledge institution to devote a number of days a week to the company. Others, on the other hand, remain full-time employed by the knowledge institution and spend weekends and evenings on their company. Regardless of the form, it emerged in all interviews that the hybrid enterprise is not for the money and the respondents are not dependent on this either. As one of the respondents described it *“It’s the extra raisins in the porridge”*. The respondents who did take part-time redundancies stated that this also poses little risk for them. Because they are still employed part-time at the knowledge institution, they expect to be able to easily return to full-time employment if this is necessary for their financial situation. In other words, within the hybrid entrepreneurship construction, they can have job security while also working as an entrepreneur.

Finally, there is the group that has remained academic until now. Logically, this group has the least financial risk as they keep their current job rather than start a business. The interviews show that these respondents themselves are still looking for what is an acceptable risk for them. These are rational considerations, for example, *“My children should be able to go to school, but I don’t have to bring them in a brand-new car.”*. However, some interviews also show that some academics consider the risk too high and have therefore decided not to set up a company. That is why they have kept their jobs at the knowledge institution, thereby completely avoiding the financial risk.

In conclusion, no indications have been found that academics become entrepreneurs because they want to earn a lot of money as was indicated by Cohen et al. (2020). However, various motivational differences were found between the groups of respondents based on risk considerations. Full-time entrepreneurs take the most risk but are willing to do it based on the belief that they can become more successful. The remaining academic group takes the least risk by simply remaining in paid employment and finally, the hybrid entrepreneurs are in between with moderate risk.

Contribution to society

In the third category, contribution to society, social and societal motivation factors are discussed. Within all groups of respondents, it was discussed that academic entrepreneurs have an intrinsic need to solve problems that arise within their field. It is indicated that they can do more for a problem from within their own company than by only researching it from the knowledge institution. In other words, actually contributing to society with the performed research is a motivational factor. The following respondent makes it clear that this need can have a motivating effect:

“I notice that technical prototype that can help people is not a product. That bothers me enormously. That I think: Isn't it well developed? Or is there no market for it? So, I notice that I really have a need to be able to contribute with such an innovation. But that is also part of the drive to develop products that are really somewhere at a certain moment. [...] The technology is there to solve a current problem; how can it be that they are still not helped? It is really frustrating to me.”

Some respondents not only show that they want to solve a problem, but that they are even obsessed with it. Therefore, they want to contribute with the performed research to help other people or organizations. Furthermore, various other aspects of a social nature are mentioned that have a motivating effect on starting an enterprise. Examples of this are contributing to employment and contributing to current social and environmental situations. Contribution to society is thus an important motivating factor for academic entrepreneurs.

However, a split arises here because some of the respondents, mainly the remaining academic and hybrid group, indicate that as academics they already contribute to society. Especially on the side of education, since knowledge is shared here with students, and they are thus prepared for their careers. This is a social aspect of education and therefore also a contribution to society. With this motivation too, the hybrid entrepreneurs experience the middle ground by being able to fulfill the social aspects of a company as well as education and research.

Intellectual challenge

The fourth and final deductive category of motivational factors is the intellectual challenge posed by entrepreneurship. It emerged in all groups of respondents that this is mainly due to the actual practical application of knowledge. It is indicated that this is a welcome change from creating knowledge (research) and sharing knowledge (education). Entrepreneurship enables them to experience for themselves what it is like to do and to provoke their knowledge instead of doing it for others. One of the respondents who are still an academic gave the reason why he is considering entrepreneurship:

“But also, above all “do”, so to speak. As a teacher, researcher, and project leader you are organizing a lot for others, so to speak. So that someone else can learn, that someone else can progress with the product or with the technology. And that's fantastic, I certainly don't want to lose that, but I also think it's nice to experience it myself. Not saying: 'that's how you can do business, that's how you should innovate, you have to pay attention to this,' but also experience that myself.”

It is indicated that the intellectual challenge goes beyond just developing the technology. The challenge of building a business is also mentioned here as a motivational challenge. This is often further from the academic entrepreneur's area of expertise and therefore presents challenges. This guarantees a form of job diversity that is described by the respondents as fun, motivating, and challenging. According to the respondents, the development of technology also goes further than at the knowledge institution. Research projects are often completed at a stage where there is a prototype or something similar. However, before it can be put on the market, a lot of work is still needed before a complete, working, and certified product can be produced. In other words, developing further than usual is a challenge that also motivates academic entrepreneurs. This motivation also partly lies in the interest that the academic entrepreneur has in his own company, which is greater than when it comes to the success or failure of a research project. One respondent cites that if you can achieve something that gives the necessary motivation:

“A prototype that gets dusty is no fun. A publication or thesis that ended up in a cupboard or the fireplace is not fun either. And now you can take on the challenge of developing it yourself and putting it on the market.”

The challenge, therefore, lies not only in the work to be done but also in what must be achieved. According to the respondents, this is intellectually stimulating and therefore one of the reasons for engaging in entrepreneurship. As one of the respondents described it *"I wanted to know if I can do it"*.

Complementing motivation categories

As already described before, the theoretical framework has found not to be complete for the motivation factors. Therefore, there are also inductive coding results next to the deductive coding results. Just as the deductive coding results about the motivation, the inductive coding results for motivation have also been combined into aggregate clusters to give a clear overview of the factors, which can be found in Table 4.3. The numbers indicate in how many interviews the factor has emerged. The complete overview of the inductive coding results can be found at the bottom of Table A2.1 in Appendix 2. This only includes the aggregate clusters based on the inductive coding results. Below Table 4.3 a discussion of the motivation factors will be given, structured by the categories.

Table 4.3 – Clustered inductive coding results for motivation

Factor	Academics	Hybrids	Entrepreneurs
Passion			
<i>Being passionate</i>	3/3	4/4	3/3
<i>Enthusiasm</i>	3/3	3/4	3/3
<i>Entrepreneurial urge</i>	3/3	4/4	3/3
<i>Satisfaction from work</i>	3/3	3/4	2/3
Doubt and uncertainty			
<i>Considerations on hybrid/fulltime</i>	3/3		
<i>Doubting about courage</i>	3/3		
<i>Innovation readiness</i>	2/3		
<i>Moment (timing)</i>	3/3		
<i>Risk avoidance</i>	2/3		

Passion

The first inductively determined category that emerged from the interviews is passion. The associated factors were found for all academic entrepreneurs, regardless of which group of respondents they belong to. It was already discussed in the introduction that entrepreneurial passion is an emerging topic in entrepreneurship research based on the article by Syed et al. (2020). However, the share of passion in the theoretical research was so small that this did not return in the theoretical framework on which the interviews are based. Because many text questions were found in all respondent groups that indicate passion, this category came back as an inductive coding result. Entrepreneurial passion can be defined as: *“consciously accessible, intense positive feelings experienced by engagement in entrepreneurial activities associated with roles that are meaningful and salient to the self-identity of the entrepreneur”* (Cardon et al., 2013, p. 519). Entrepreneurial passion has to do with topics as enthusiasm and curiosity, it cannot be taught and is, therefore, an intrinsic motivation (Cardon et al., 2013; Syed et al., 2020).

When looking at the interviews, a wide range of passion-related answers was found. First of all, there is passion from the field in which entrepreneurship is used as a means. For example, when respondents indicate that they always want to work in their field and that it offers them the opportunity to continue specific research. This motivation is an extension of motivation factors that have already been discussed. For example, the intellectual challenge of being able to further develop the technology. It turns out that this is not only about the challenge, but that the academic entrepreneurs also experience this as fun and even get excited about it. Subsequently, the respondents indicate that they have a far-reaching affinity with their field and that they would therefore like to start a company in that specific field. Several arguments are mentioned where this affinity comes from. Some respondents indicate that they simply find the field interesting. At the same time, other respondents say they find a particular field interesting because they feel they can help many people and/or companies there. Here again, the aspect is discussed that some academic entrepreneurs are fascinated by a certain problem and then cling to it to find a solution. When from such ideas they have actually helped to make a problem less impactful or even solve it, that much satisfaction can be obtained which motivates them to keep going.

In addition to a passion for the subject, a passion for entrepreneurship is also mentioned. This is also an aspect in which a lot of satisfaction can be achieved according to the respondents. The interviews show that many respondents find it difficult to substantiate why they find entrepreneurship in itself attractive. It is indicated that it is a difficult urge to become an entrepreneur, it is seen as 'cool' to do. In addition, a high level of enthusiasm is noted among respondents when talking about entrepreneurship. Finally, the term 'thrill-seeking' is introduced by two respondents, referring to following a long-standing ambition, the uncertainty that comes with it, and expecting the unexpected when taking the step to become an entrepreneur. The following quotes have been added to indicate how passion is expressed within the respondent groups:

- Academics: *“Call it 'thrill seeking', So seeking the thrill, it's the thrill of uncertainty. That gives me an incredible kick.”*
It tingles when I think about it, so sooner or later that will make the difference, and I will probably take that step.”
- Hybrids: *“It's a primal feeling, I just really want to do it.”*
“The main reason? That's really the enthusiasm. If it hadn't been for that, there's no point in doing it for me.”
- Entrepreneurs: *“I just want to make it a success, entrepreneurship was a long-awaited step and I enjoy it every day”*
“I am consciously working on my business full time. If I enjoy it so much, why should I only do it part-time? In fact, I now do much more than the 40 hours a week that is considered full-time.”

Doubt and uncertainty

The last category of motivational factors is doubt and uncertainty. This is an interesting category of motivations for academic entrepreneurs because it mainly prevents them from becoming entrepreneurs. The motivational factors within this category were therefore only considered to be relevant for the group of respondents who remained academic. Of course, there was doubt and uncertainty among everyone, but the respondents who became entrepreneurs indicate that they have taken this for granted and that it was no longer an important motivation at the time of the decision. This appears to be different for the group that has remained academic and that it is a restraining factor.

Various types of doubt and uncertainty were identified during the interviews with the academics. First of all, it emerges that there is doubt about the timing, both the moment in the career and the moment in life play a role here. For the career, there are doubts about which career phase is suitable for becoming an entrepreneur. There are also doubts about when the right moment is for the phase of life. The respondents indicate, for example, that they have young children or have just bought a house, these are just examples of the arguments given why it might not be the right time to become an entrepreneur. However, this appears to be a continuously recurring doubt, as evidenced by a comment from a respondent:

“Frankly, I wonder when the right time is because there is always something in the private sphere that can make me decide not to take the step.”

In addition to timing in the life and/or career phase, the interviews also revealed uncertainty about the readiness of a technology. It is indicated that respondents find it difficult to estimate when a technology is ready to set up a company with it. This also involves assessing the suitability of a technology. The interviews show that academic entrepreneurs see many possible innovations during their time at the knowledge institution. This can make it difficult to find the right technology to start a business with. When the possibly suitable technology has been found, it appears that there is still doubt about when the technology has developed sufficiently to be adopted from the knowledge institution. Here too, a matter of uncertainty becomes apparent. One respondent indicated that he wanted to transfer the technology from the knowledge institution to a company as early as possible because then it would not yet have an IP and the knowledge transfer would be easier. On the other hand, other respondents say they want to do this as late as possible because it is then further developed and therefore the risk is lower.

In addition, the risk is in any case an aspect that frequently came up in the interviews with the remaining academics group. The arguments for this were very diverse. One of the respondents summed it up well with the statement *“It is the risk of the unknown”*. It is indicated that the part of doubt and uncertainty that the respondents experience also partly stems from wanting to avoid risk. This is also reflected when it is discussed whether the academics aspire to a hybrid or full-time form of entrepreneurship. Hybrid entrepreneurship is seen as attractive because it entails a lower risk (since the job at the knowledge institution can be kept). It is also said that full-time entrepreneurship may be too risky and therefore not an option at all. On the other hand, the respondents also mention that hybrid entrepreneurship can also be limiting because only a limited amount of time can be invested in the start-up. There is also doubt about the appropriate balance, it is indicated that it is difficult to decide what the ratio should be between the two orbits. While the advantage is that the academic can continue to do research from the knowledge institution. Ultimately, all respondents indicated that they would first like to opt for a hybrid form of entrepreneurship because of the lower risk. However, it is also said that this is mainly seen as an intermediate step towards full-time entrepreneurship. In conclusion, within the group of respondents who remained academic, there is a lot of doubt and uncertainty on various aspects as discussed above.

5. Conclusion and discussion

In the last chapter of this thesis, first, the key findings are presented and discussed in section 5.1. Subsequently, based on the conducted research, the implications for both theory and practice will be indicated in section 5.2. Followed by the limitations of the research conducted that will be discussed in section 5.3. Finally, section 5.4 provides guidelines for future research based on the conducted research.

5.1 Key findings

The main goal of this research was to identify the context and motivations of knowledge institutions employees at the moment the decision is made to commence an entrepreneurial process. This knowledge contributes to supporting employees of knowledge institutions in their decisions and supports universities and governments to affect these decisions. The MRQ to be answered in this research was:

What are personal motivations in context of academic entrepreneurial employees of knowledge institutions at the moment they decide to commence an entrepreneurial process in their career path?

The results based on the conducted research are summarized below. First of all, Figure 5.1 shows the final picture of the context. With the two noted exceptions, this picture is representative of all three groups of respondents. Therefore, this figure shows the context of academic entrepreneurship, within the scope of the research.

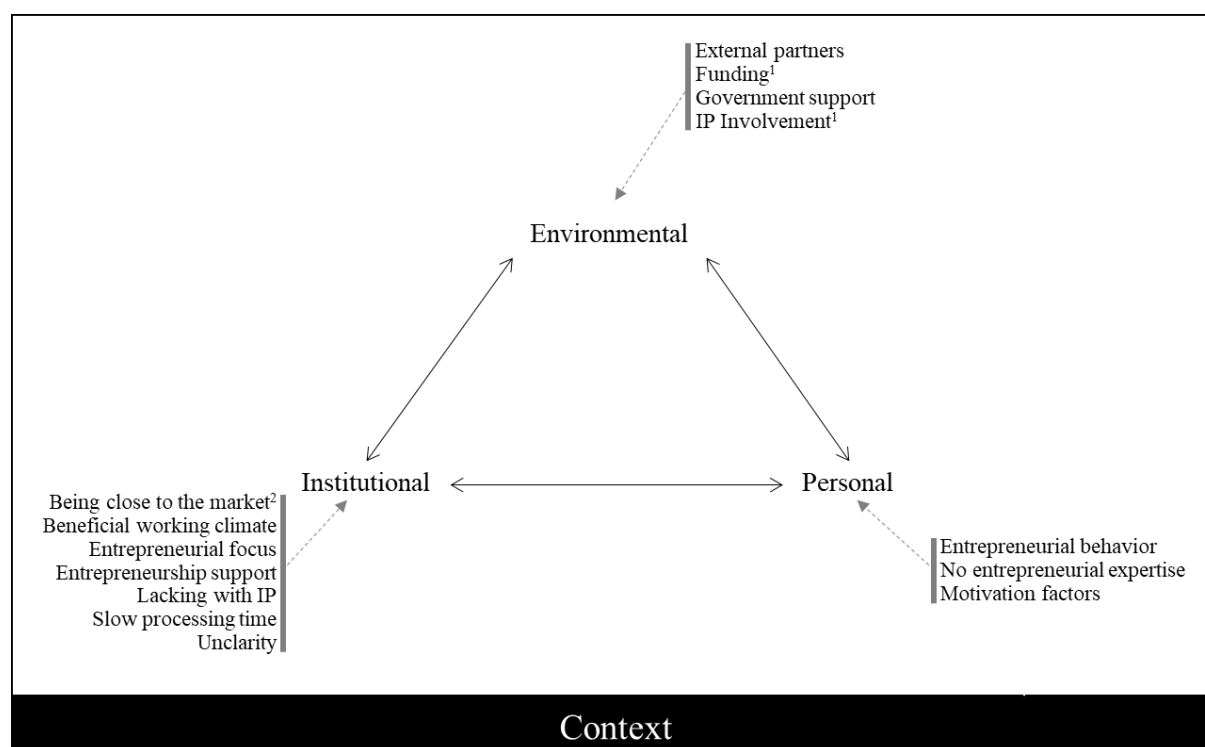


Figure 5.1 – Context of academic entrepreneurship

¹Not applicable for respondents that remained academic

²Only applicable for hybrid entrepreneurs

No essential differences were therefore found between the context for academic entrepreneurs who enter full-time or hybrid entrepreneurship or remain academic. This is a logical observation because the context does not depend on the final decision. All academic entrepreneurs find themselves in the same situation in which they decide whether or not to eventually become an entrepreneur and in what form this will be.

First of all, conflicting results were found within the institutional context. On the one hand, knowledge institutions stimulate academic entrepreneurship, and it is included in the mission and vision. The working climate is experienced as suitable for taking the initial steps and there is (emerging) support. However, there is also a more negative picture. There is a lot of uncertainty, everything around entrepreneurship takes too long and the IP policy is lacking. The general picture that eventually arises about the institutions is that they act as a discouraging factor, more than they promote academic entrepreneurship. This partially contradicts the findings of Civera et al. (2020), which states that the TTOs and universities are mainly there for the employees and to help them. It is becoming clear that academic entrepreneurs do not see it as help, but rather the other way around. However, the Balven et al. (2018) research is confirmed that the institutions pay little attention to the academic entrepreneur and the important conclusion that bypasses are even being sought to get out of the IP or technology transfer process. The results are also in line with the Meoli and Vismara (2016) study, which indicates that the stimulating effect of the knowledge institution on entrepreneurship is only marginal and can even have a negative effect. The research conducted also shows that in some cases the knowledge institution itself has disheartening effects on academic entrepreneurs.

Second, in the environmental context, it became clear that the factors from the environmental context were not equally apparent for every respondent. This is situation-dependent and therefore differs per academic and the technology for the start-up. In theory, these differences in the impact of the environment are known and so this is in line with the results of this research (Cohen et al., 2020; Criaco et al., 2014; Foo et al., 2016). In the environmental context, influence was observed from the market and (research) partners. Academic entrepreneurs can exploit their existing networks to gain access to resources. When resources are expressed in money for financing the start-up, there is also a role for the government. Respondents indicate that they can receive governmental incentives, such as a take-off grant. Finally, depending on the research project, external parties may be entitled to partial ownership of the IP or technology. In that case, there is also involvement in the accompanying IP or technology transfer from the environmental context. This is corresponding with the findings from theory (Cohen et al., 2020; Criaco et al., 2014; Halilem et al., 2017; Hesse & Sternberg, 2017).

Finally, there is the personal context as defined in the SLR. Part of this is the description of the person who is an academic entrepreneur based on Halilem et al. (2017), Miller, Alexander, et al. (2018), and Miller, McAdam, et al. (2018). Since this was used for selecting respondents, no comparison with the theory is possible about the person and the associated entrepreneurial behavior. However, it can be concluded that entrepreneurial behavior was observed during the interviews. In addition to personality and behavior, the personal context also consists of motivational factors. The final results of these parts of the interviews have been worked out for each respondent group, given that, in contrast to the context, differences between motivation were noted. For each respondent group, the results are presented visually in Figure 5.2, Figure 5.3, and Figure 5.4 on the next page. Following this, a discussion of the results can be found, in which the differences will be explained and a comparison with theory will be made.

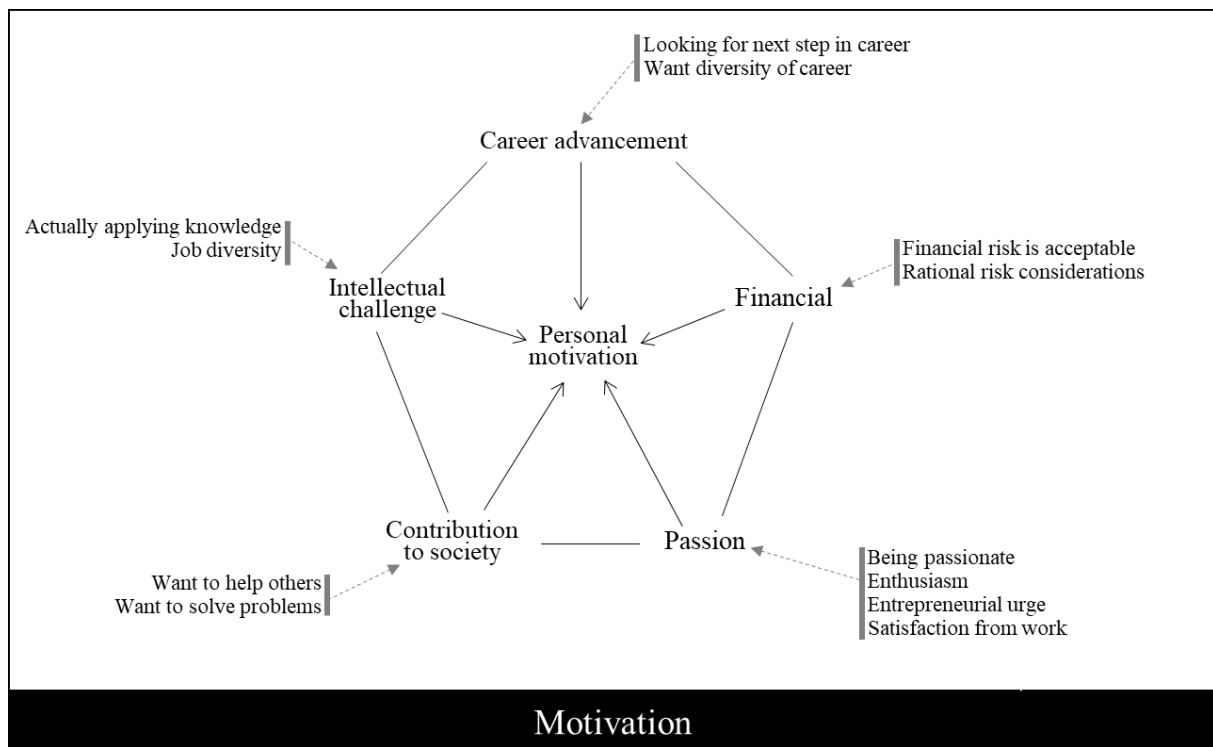


Figure 5.2 – Motivations of academic entrepreneurs that become fulltime entrepreneur

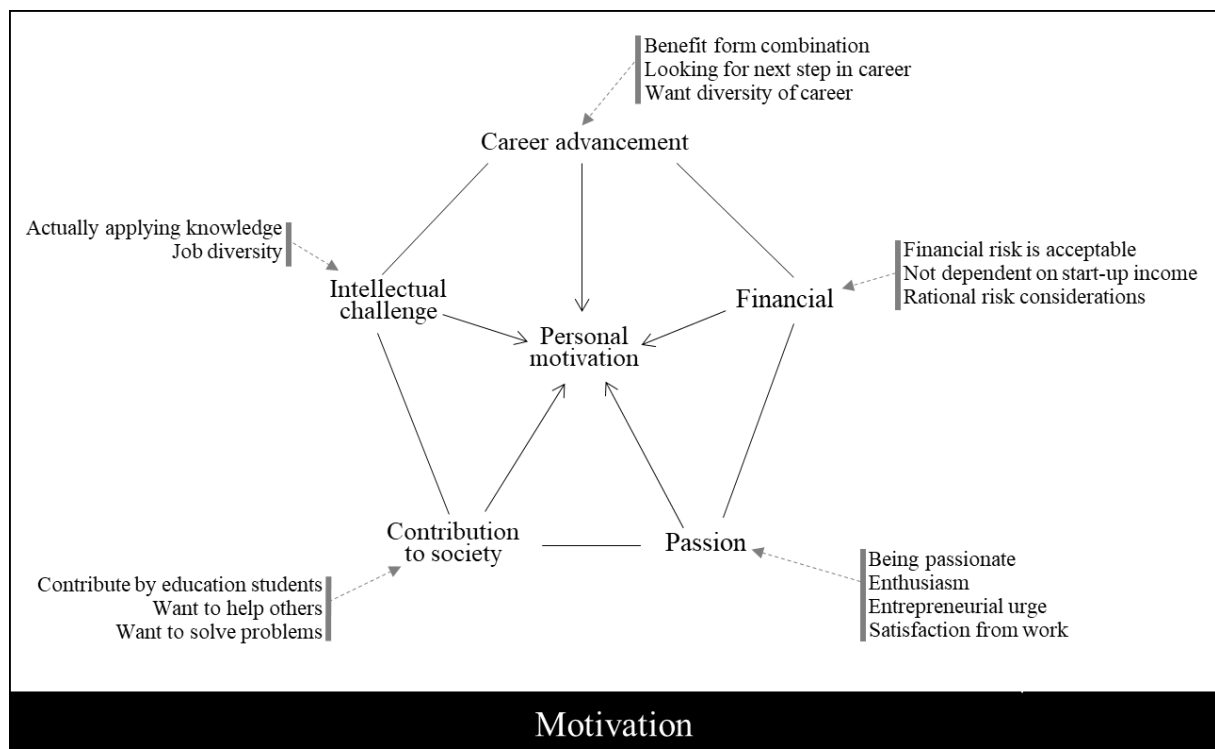


Figure 5.3 – Motivations of academic entrepreneurs that become hybrid entrepreneur

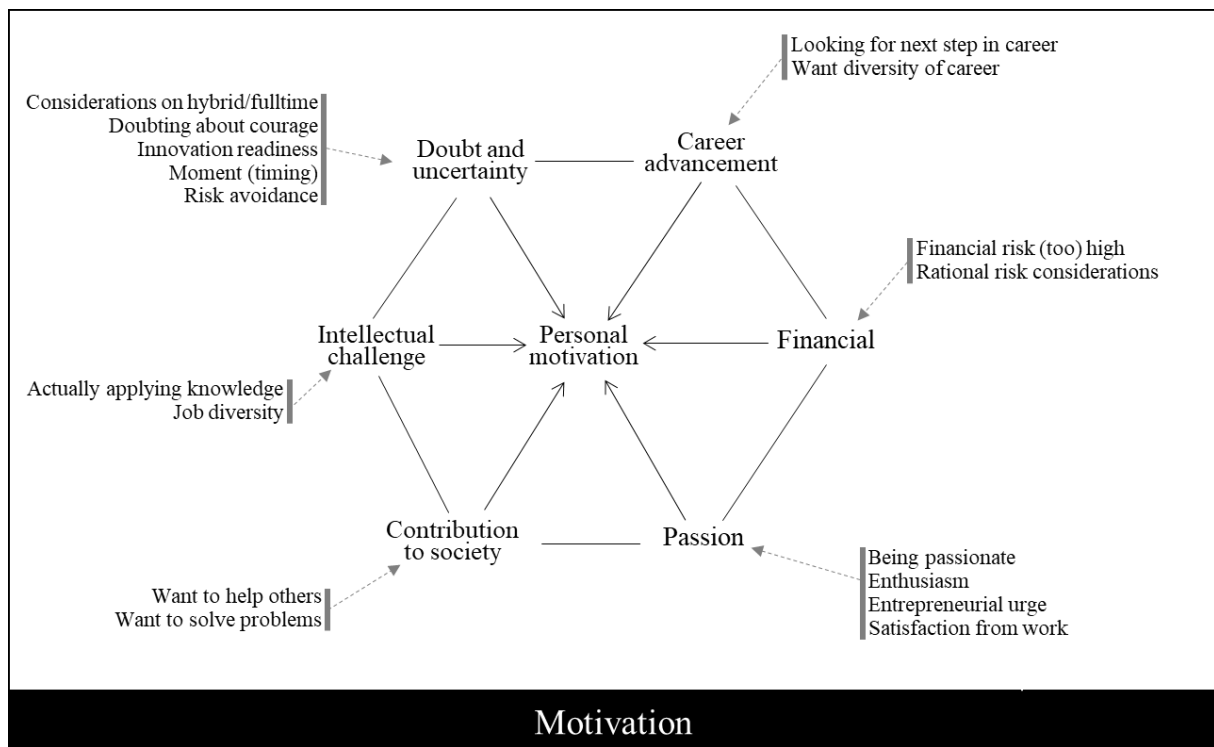


Figure 5.4 – Motivations of academic entrepreneurs that remain academic

The four categories for motivation factors selected based on the Cohen et al. (2020) framework have been confirmed for all respondent groups. This means that motivational factors for academic entrepreneurship have been identified in the following areas: career advancement, financial, contribution to society, and intellectual challenge. In addition, a category for motivational factors emerged in the interviews that are not included in the theoretical framework, namely passion. The article by Syed et al. (2020) already indicated that the attention for passion as an important factor in entrepreneurship in the literature is still not given enough attention. The fact that the subject receives little attention is apparent from the fact that it has not been highlighted sufficiently in the SLR to be included in the theoretical framework. However, the subject emerged in all three groups of respondents to such an extent that passion still emerged in the results due to the inductive coding round. Finally, another category has been added to the motivation to remain academic, which is doubt and uncertainty. For an explanation of the factors used within all six categories in Figure 5.2 to Figure 5.4, a reference is made to section 4.2.

The theoretical framework has been set up based on the SLR, which suggests that based on motivation factors there is a distinction at two moments, causing a deviation in the career page. The first is the decision between whether or not to become an entrepreneur and the second is the decision between hybrid entrepreneurship and full-time entrepreneurship. These two decision moments will be discussed below based on the collected research data.

Become an entrepreneur or remain academic

The first identified difference between whether or not to commence an entrepreneurial process lies in the motivation factors category doubt and uncertainty. The doubts in the field of risk-taking, timing, innovation readiness, having the courage, and deciding between full-time and hybrid ensure that academics are prevented from becoming entrepreneurs. The risk of the unknown therefore plays a role. The lack of clarity and the policy from the knowledge institution discussed in context reinforces this effect. In the interviews with people who have become entrepreneurs, this effect is not relevant, which indicates that they have overcome the doubt and the other motivational factors have overshadowed this feeling. It is also indicated that sometimes the right opportunity has simply presented itself so that the step has not yet been taken.

The second difference falls in the motivational category financial and has to do with financial risk perception. The respondents who do become entrepreneurs indicate that they have been in a situation at that time in which the risk taken to start an entrepreneurial activity can be regarded as acceptable. The group that remains academic indicates that they see higher financial risks and that they are not always able (or unwilling) to take these risks in every phase of their life or career. However, it must be said that this is not a black-and-white scenario and that academic entrepreneurs deal rationally with financial risk.

Furthermore, it is particularly striking that a substantial part of the motivational factors that the academic entrepreneurs who are or are not experienced as entrepreneurs correspond. The underlying logic is that they are all entrepreneurial and exhibit entrepreneurial behavior, giving them similar motivation and also the identified 'urge' to become entrepreneurs. Finally, it must be said that the distinction between becoming an entrepreneur or not is broader than just motivation. For example, it must also be the right time, suitable technology must be available, cooperation from the institution and/or environment, and so on. The academic entrepreneurs once consciously opted for a career at an educational institution, which also indicates that most of them are in the right place and have a nice job. In this case, Civera et al. (2020) also indicate that necessary entrepreneurship will be out of the question and a possible decision will be related to opportunity entrepreneurship. This may partly explain why some academic entrepreneurs are not (yet) entrepreneurs.

Hybrid or full-time entrepreneurship

Differences were also found between the motivational factors of hybrid and full-time entrepreneurs. First of all, the hybrid respondents indicate that they experience benefits from the combination. Because they are still involved with the knowledge institution, they can develop their careers in two areas, as academics, and as entrepreneurs. In addition, as discussed above, academic entrepreneurs have consciously opted for a career in education. Reasons given for this are, for example, enjoying working with and educating students. This can be maintained by opting for hybrid entrepreneurship. In their view, this means that the hybrid entrepreneurs make an extra contribution to society. Full-time entrepreneurs, on the other hand, see it as an advantage to have no more obligations towards the knowledge institution. This creates a full-time focus on the start-up, which according to the respondents increases the chance of success.

In contrast, in the motivation category financial it is mentioned that the hybrid form of academic entrepreneurship limits the risk. The further development of technology into a saleable product is a process that still takes a lot of time and money, according to the respondents. This confirms the findings of Qian et al. (2018) which show that innovations from institutions are premature and cost a lot of money to develop further. That is why the hybrid respondents indicate that this can be done better if (partial) salary from the knowledge institution continues to be received.

In conclusion, hybrid entrepreneurship can be seen as a middle ground between remaining an academic and becoming a full-time entrepreneur. The conducted research also shows that it is not only a middle ground but also an intermediate step. Academic entrepreneurs see the hybrid form of entrepreneurship as a safe step towards entrepreneurship. When they are successful as entrepreneurs, they can easily terminate their remaining employment at the knowledge institution and become full-time entrepreneurs. However, if it is not successful, it is easier to return to full-time employment at the knowledge institution and end the company that has been created.

Finally, in this section on the findings, the sub-questions posed in the introduction will be answered. In Table 5.1 the sub-questions are repeated, and a concise answer is added. For each sub-question in Table 5.1, reference is also made to the section in which the answer is elaborated.

Sub-question	Reference	Concise answer
1) How can academics be defined in relation to entrepreneurship?	Theory (§2.3)	A distinction can be made between three types of academics when academic entrepreneurship is concerned, namely non-entrepreneurial, entrepreneurial academics, and academic entrepreneurs.
2) What are the common entrepreneurial career paths for academics?	Theory (§2.4)	There are three entrepreneurial career paths for academics found in the literature, namely remain academic, become a hybrid entrepreneur, or full-time entrepreneur.
3) Which personal motivations and context for deciding to become an entrepreneur are known yet in literature?	Theory (§2.5)	For context, factors were found that can be found within the categories: environmental context, institutional context, and personal context. For motivation, factors were found within the categories: career advancement, financial, contribution to society, and intellectual challenge.
4) What barriers and drivers form the context in deciding between remaining academic, becoming a hybrid, or a full-time entrepreneur?	Results (§4.1)	As elaborated in section 4.1 and summarized in Figure 5.1, barriers and drivers have been found in the environmental, institutional, and personal context. Most barriers and restraining factors come from the institution, while most drivers have been identified from the environment and personal side.
5) What are the personal motivations of academic entrepreneurial employees of knowledge institutions to commence an entrepreneurial process?	Results (§4.2)	Multiple factors were found within the categories: career advancement, financial, contribution to society, and intellectual challenge, confirming the theoretical framework. In addition, motivational factors related to entrepreneurial passion were found. Finally, doubt and uncertainty play a role as the reason why academics do not commence an entrepreneurial process.

6) What are the personal motivations of academic entrepreneurial employees of knowledge institutions to decide between becoming hybrid or a full-time entrepreneur?	Results (§4.2)	Hybrid entrepreneurs have advantages because they are still connected to the institution. On the one hand, intrinsic motivation for education applies here, but also a degree of certainty. On the other hand, full-time entrepreneurship provides a certain focus and dedication that brings benefits to the start-up. In conclusion, hybrid entrepreneurship is a middle ground but also an intermediate step for full-time entrepreneurship.
---	----------------	---

Table 5.1 – Answers to sub-questions

5.2 Implications

First of all, the theoretical implications will be discussed. Based on the context categorization adapted from Seguí-Mas et al. (2018) and the motivation categorization from Cohen et al. (2020), a framework has been developed to capture the moment of commencing into academic entrepreneurship. Based on this, the context and motivation of Dutch academic entrepreneurship in the field of technology have been mapped out using interviews. This confirms the theoretical foundation of this research. Additional factors have also been identified, as indicated in the results.

While previous research has focused on the institution, these results demonstrate that focussing on the academic entrepreneur is just as important. Foo et al. (2016) have indicated the vital role of institutions in the process around academic entrepreneurship. A range of studies on academic entrepreneurship then focuses on the institution, such as Algieri et al. (2013), Civera et al. (2020), Klofsten et al. (2019), and Meoli and Vismara (2016). All kinds of stimulation and facilitation resources are discussed that can help the institution deal with academic entrepreneurship even better. As a result, knowledge institutions have been able to develop their entrepreneurial vision and behavior (Balven et al., 2018). However, in this research that focuses on the academic entrepreneur himself, it appears that the support from the knowledge institution still leaves much to be desired. It is sometimes mentioned that the knowledge institutions, for example, mention entrepreneurship in their mission and vision. But the translation into action that benefits the academic entrepreneur is currently too limited. Many respondents see the knowledge institution as a bottleneck within the entrepreneurship process. In addition, the other context and motivational factors in this research from the perspective of the employee of the knowledge institution have also been identified. This means that not only the results about the knowledge institution but also the rest of the picture are relevant as an addition to the literature. This refers to the confirmation of the applicability of motivational factors such as Cohen et al. (2020), among others described. But also, the clear picture that has emerged about the role of passion for academic entrepreneurs in all respondent groups, for which the first reason was already given by Syed et al. (2020). Finally, the finding that in the group that (so far) decided not to become an entrepreneur has a clearer experience of doubt and uncertainty is an interesting addition. This also indicates that the academics who do become entrepreneurs have dealt with this doubt and uncertainty in a different way or have neglected it because of the situation that existed at the time. It makes sense that these feelings are always there, but at some point, they become less relevant. These are all findings that are limited or not addressed in the current literature in which the knowledge institutions are central. Therefore this research is academically relevant, since research on the micro-level, concerning the academic entrepreneur, is rather limited in academic literature (Balven et al., 2018; Qian et al., 2018).

Second, there are the practical implications. The practical implications are for two parties, just as the aim of the research was originally set up. These are the knowledge institutions and their employees with entrepreneurial needs. These parties can both benefit in their way from this research.

For employees of knowledge institutions, this research contributes by giving insights into the context and motivation factors of other academic entrepreneurs. The context concluded, as described in the results, that this is a general picture and that it does not depend on the final decision made. This means that the context of academic entrepreneurship as presented in this study can be used by employees or knowledge institutions for reference. In addition, the identified motivational factors provide insight into the considerations that academic entrepreneurs have made and on which they have based their decision. This helps potential academic entrepreneurs in making their decision.

For institutions, the overall findings can be used to improve how they handle academic entrepreneurship. As was stated in the introduction, universities need to be able to fulfill a new role in society and therefore they need to have a grip on academic entrepreneurship. This study has identified numerous aspects on which the institutions are currently lacking when academic entrepreneurship is concerned. Simultaneously, this research has identified the motivations of academic entrepreneurs and therefore mapped out the needs of the academic entrepreneur. This is relevant for knowledge institutions to be able to respond in a targeted manner to improve their services to employees and to facilitate from entrepreneurial intentions to a start-up. The same is applicable for agencies and organizations that are identified in the environmental context such as external (research)partners and the government. A checklist has been drawn up to support the management of knowledge institutions in creating policy around academic entrepreneurship that remedy their current shortcomings. This is for the management of the knowledge institution and those involved in making policy. The checklist is based on the shortcomings of knowledge institutions and the needs of academics that emerged from the interviews. On the next page, Figure 5.5 shows the checklist consisting of ten questions that the knowledge institution should ask when drawing up a new policy. For each question, one or more aspects are given for operationalization.

☒ Is the policy in line with the institution's mission and vision? • It must be determined how and to what extent entrepreneurship is reflected in the strategic goals of the institution. • The support and policy surrounding academic entrepreneurship must match the strategic goals that have been set.
☒ Is the TTO able to support academic entrepreneurs sufficiently? • The employees of the TTO must have the right knowledge to be able to offer the right help. • The TTO must have sufficient capacity to sufficiently support all potential academic entrepreneurs.
☒ Is the working environment suitable to stimulate the start of entrepreneurship? • Employees should have the freedom to discover opportunities and to take the first steps towards a potential company.
☒ Is the policy transparent for employees? • Academics who are not yet entrepreneurs must have insight into what they can and cannot expect from the institution. • Hybrid entrepreneurs should have clarity about what they can and cannot do.
☒ Is the support visible to employees? • The employees know where or who to contact for entrepreneurship matters. • The support for entrepreneurship is not only disseminated to students, but also employees. • An active search is made for possible academic entrepreneurs and the role that the knowledge institution plays in this is promoted.
☒ Is the policy fair to employees? • The department that supports the academic entrepreneur should not be the same one he negotiates with to avoid conflict of interests. • In the first instance, the policy of the institution should not focus on the financial interest of the institution.
☒ Is the policy supportive for employees? • It has emerged that at present the institution is often more of a counteracting factor than a supporting factor. It is, therefore, necessary to check whether the policy is supportive from the point of view of the academic.
☒ Does the policy work fast enough? • Academic entrepreneurs should be able to know where they stand in a short period. • The role of the institution and its policy should not influence the academic entrepreneur's time-to-market by, for example, using a lengthy IP process.
☒ Does the policy give employees confidence? • The policy should remove doubt and uncertainty as this is a strong restraining factor for academic entrepreneurship. • The policy should not complicate the complex academic entrepreneurship process, but rather support and make it easier for the academic.
☒ Does the policy inspire employees? • Given the important role of passion, policy should have a stimulating effect on the passion of the academic entrepreneur.

Figure 5.5 – Academic entrepreneurship policy checklist for management of institutions

5.3 Limitations

When reading and interpreting the results, the scope of the research should be considered for nuance. Given that the research focused specifically on Dutch knowledge institutions and start-ups, and specifically in the field of technology. As a result, the results cannot simply be generalized to an image outside this scope. This is confirmed in the existing literature. According to Cohen et al. (2020), academic entrepreneurship does differ across fields and according to Davey et al. (2016), there are many differences between countries. That is why the validity of this research is only for Dutch start-ups from academic entrepreneurs in the field of technology.

The significance of the results must then be treated critically. Following the objective, the research is aimed at identifying context and motivational factors. It is beyond the scope of this study to investigate to what extent a context or motivational factor has an impact on the decision made by the academic entrepreneur. In other words, the results describe all factors that have an impact, but not the weight with which they influence the decision. Even though the results are reliable and valid, no statements can be made whether one motivation outweighs another, for example. The MRQ might suggest a quantitative research design since it was factor-based. This suggests a potential mismatch when comparing the MRQ and results. The current research design was chosen because it allowed further questioning to identify underlying factors. Given the qualitative approach, the research has given insight into how it works, but not how much impact something has.

At last, the sample size of $n=10$ provides a reliable picture of the general situation as intended in the study. Data saturation has also developed during the interviews, which indicates that the results represent a complete picture of reality. However, because three groups of respondents were used, the sample size of the three individual groups is smaller. The groups remain academic, hybrid entrepreneurs and full-time entrepreneurs have a proportional size of $n=3$, $n=4$, and $n=3$. It should be noted that data saturation also developed during these interviews so that a complete picture is assumed here as well. Nevertheless, the author makes this comment to make the reader aware of where the possible lack of a context or motivational factor can come from. In addition to the smaller sample size per group, a possible bias in convenience sampling may have occurred. The respondents qualify as research subjects, considering they are academic entrepreneurs in the field of technology in the Netherlands. We also managed to find ten respondents from five different knowledge institutions spread over the Netherlands. The remaining small chance of having a convenience sample bias in the selected respondents remains.

5.4 Future research

The research conducted is a good reason to broaden and deepen the research topic. Both are relevant to increase knowledge about academic entrepreneurship from the perspective of the academic himself. First of all, the current research can be deepened by taking into account the degree of influence. This deepening can be achieved by carrying out research similar to that for this thesis, but then with a quantitative research design. Then it is not only determined which factors have an influence, but also how much influence they have. Secondly, the research can also be broadened to do comparable research for another country or another field. Besides the fact that this is of added value for the country and field that is chosen, it also makes it possible to make a comparison between different countries and/or fields. When differences are identified, this enables it to learn from the way of acting in a certain field or country and to apply this elsewhere.

In addition, it is recommended to conduct further research into the role of institutions in academic entrepreneurship. Both the theory and the interviews have shown that their role is essential. The collected data, however, paints a picture that does not put the institutions in a good light. Respondents themselves indicate that until now, in a negative sense, the actions of the university or university of applied science have been precisely the reason for not becoming an entrepreneur. The checklist in Figure 5.5 provides guidelines for reviewing policy on academic entrepreneurship for institutions. The aim of this is to improve policy and thereby enable institutions to deal with it correctly and to provide incentives for academic entrepreneurship. Further research into how knowledge institutions can better serve and incentivize their employees concerning academic entrepreneurship and improve their policy is therefore recommended.

Finally, it was noticed during the SLR that little is known in the literature about hybrid entrepreneurship in combination with academic entrepreneurship. However, the research has shown that the hybrid form of academic entrepreneurship has many advantages and disadvantages and entails an unexpected complexity. The fact that respondents indicate that they use hybrid entrepreneurship as an intermediate form and as a steppingstone to full-time entrepreneurship also has implications for the knowledge institution. More research into hybrid entrepreneurship is needed for a better understanding of how hybrid academic entrepreneurship can be better handled.

References

- Algieri, B., Aquino, A., & Succurro, M. (2013). Technology transfer offices and academic spin-off creation: The case of Italy. *Journal of Technology Transfer*, 38(4), 382–400. <https://doi.org/10.1007/s10961-011-9241-8>
- Balven, R., Fenters, V., Siegel, D. S., & Waldman, D. (2018). Academic Entrepreneurship: The Roles of Identity, Motivation, Championing, Education, Work-Life Balance, and Organizational Justice. *Academy of Management Perspectives*, 32(1), 21–42. <https://doi.org/10.5465/amp.2016.0127>
- Barn, B., Barat, S., & Clark, T. (2017). Conducting systematic literature reviews and systematic mapping studies. *ACM International Conference Proceeding Series*, 212–213. <https://doi.org/10.1145/3021460.3021489>
- Canits, I., Bernoster, I., Mukerjee, J., Bonnet, J., Rizzo, U., & Rosique-Blasco, M. (2019). Attention-deficit/hyperactivity disorder (ADHD) symptoms and academic entrepreneurial preference: is there an association? *Small Business Economics*, 53(2), 369–380. <https://doi.org/10.1007/s11187-018-0057-x>
- Cardon, M. S., Gregoire, D. A., Stevens, C. E., & Patel, P. C. (2013). Measuring entrepreneurial passion: Conceptual foundations and scale validation. *Journal of Business Venturing*, 28(3), 373–396. <https://doi.org/10.1016/j.jbusvent.2012.03.003>
- Civera, A., Meoli, M., & Vismara, S. (2020). Engagement of academics in university technology transfer: Opportunity and necessity academic entrepreneurship. *European Economic Review*, 123, 103376. <https://doi.org/10.1016/j.eurocorev.2020.103376>
- Cobb-Clark, D. A., & Schurer, S. (2012). The stability of big-five personality traits. *Economics Letters*, 115(1), 11–15. <https://doi.org/10.1016/j.econlet.2011.11.015>
- Cohen, W. M., Sauermann, H., & Stephan, P. (2020). Not in the job description: The commercial activities of academic scientists and engineers. *Management Science*, 66(9), 4108–4117. <https://doi.org/10.1287/mnsc.2019.3535>
- Criaco, G., Minola, T., Migliorini, P., & Serarols-Tarres, C. (2014). “To have and have not”: founders’ human capital and university start-up survival. *The Journal of Technology Transfer*, 39, 567–593. <https://doi.org/10.1007/s10961-013-9312-0>
- Davey, T., Rossano, S., & van der Sijde, P. (2016). Does context matter in academic entrepreneurship? The role of barriers and drivers in the regional and national context. *Journal of Technology Transfer*, 41(6), 1457–1482. <https://doi.org/10.1007/s10961-015-9450-7>
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1. <https://doi.org/10.11648/j.ajtas.20160501.11>
- Etzkowitz, H. (2013). StartX and the “Paradox of Success”: Filling the gap in Stanford’s entrepreneurial culture. *Social Science Information*, 52(4), 605–627. <https://doi.org/10.1177/0539018413498833>
- Farrokhi, F., & Mahmoudi-Hamidabad, A. (2012). Rethinking Convenience Sampling: Defining Quality Criteria. *Theory and Practice in Language Studies*, 2(4), 784–792. <https://doi.org/10.4304/tpls.2.4.784-792>
- Félix-González, M., Husted, B. W., & Aigner, D. J. (2017). Opportunity discovery and creation in social entrepreneurship: An exploratory study in Mexico. *Journal of Business Research*, 81, 212–220. <https://doi.org/10.1016/j.jbusres.2016.10.032>
- Foo, M., Knockaert, M., Chan, E. T., & Erikson, T. (2016). The Individual Environment Nexus :

- Impact of Promotion Focus and the Environment on Academic Scientists' Entrepreneurial Intentions. *IEEE Transactions on Engineering Management*, 63(2), 213–222.
<https://doi.org/10.1109/TEM.2016.2535296>
- Formica, P. (2002). Entrepreneurial Universities. *Industry and Higher Education*, 16(3), 167–175.
<https://doi.org/10.5367/000000002101296261>
- Guerrero, M., Urbano, D., Fayolle, A., Klofsten, M., & Mian, S. (2016). Entrepreneurial universities: emerging models in the new social and economic landscape. *Small Business Economics*, 47(3), 551–563. <https://doi.org/10.1007/s11187-016-9755-4>
- Halilem, N., Amara, N., Olmos-peñuela, J., & Mohiuddin, M. (2017). “To Own, or not to Own?” A multilevel analysis of intellectual property right policies' on academic entrepreneurship. *Research Policy*, 46(8), 1479–1489. <https://doi.org/10.1016/j.respol.2017.07.002>
- Hayter, C. S. (2011). In search of the profit-maximizing actor: motivations and definitions of success from nascent academic entrepreneurs. *The Journal of Technology Transfer*, 36, 340–352.
<https://doi.org/10.1007/s10961-010-9196-1>
- Hayter, C. S. (2015). Public or private entrepreneurship? Revisiting motivations and definitions of success among academic entrepreneurs. *Journal of Technology Transfer*, 40(6), 1003–1015.
<https://doi.org/10.1007/s10961-015-9426-7>
- 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>
- Hesse, N., & Sternberg, R. (2017). Alternative growth patterns of university spin-offs: why so many remain small? *International Entrepreneurship and Management Journal*, 13(3), 953–984.
<https://doi.org/10.1007/s11365-016-0431-6>
- Huang, C. Y. (2018). How background, motivation, and the cooperation tie of faculty members affect their university–industry collaboration outputs: an empirical study based on Taiwan higher education environment. *Asia Pacific Education Review*, 19(3), 413–431.
<https://doi.org/10.1007/s12564-018-9546-5>
- Johnson, M., Monsen, E. W., & MacKenzie, N. G. (2017). Follow the Leader or the Pack? Regulatory Focus and Academic Entrepreneurial Intentions. *Journal of Product Innovation Management*, 34(2), 181–200. <https://doi.org/10.1111/jpim.12355>
- Klofsten, M., Fayolle, A., Guerrero, M., Mian, S., Urbano, D., & Wright, M. (2019). The entrepreneurial university as driver for economic growth and social change - Key strategic challenges. *Technological Forecasting & Social Change*, 141(December 2018), 149–158.
<https://doi.org/10.1016/j.techfore.2018.12.004>
- Lamine, W., Mian, S., Fayolle, A., Wright, M., Klofsten, M., & Etzkowitz, H. (2018). Technology business incubation mechanisms and sustainable regional development. *Journal of Technology Transfer*, 43(5), 1121–1141. <https://doi.org/10.1007/s10961-016-9537-9>
- Li, Y., Zou, B., Guo, F., & Guo, J. (2020). Academic entrepreneurs' effectuation logic, role innovation, and academic entrepreneurship performance: an empirical study. *International Entrepreneurship and Management Journal*. <https://doi.org/10.1007/s11365-020-00702-w>
- Link, A. N., Siegel, D. S., & Wright, M. (2015). *The Chicago Handbook of University Technology Transfer and Academic Entrepreneurship*. University of Chicago Press.
<https://doi.org/10.7208/chicago/9780226178486.001.0001>
- Locke, K., Feldman, M., & Golden-Biddle, K. (2020). Coding Practices and Iterativity: Beyond Templates for Analyzing Qualitative Data. *Organizational Research Methods*, 109442812094860. <https://doi.org/10.1177/1094428120948600>

- Marcolongo, M. (2017). *Academic entrepreneurship: How to bring your scientific discovery to a succesful commerical product* (1st ed.). Wiley.
- Martin, A. M., Abd-El-Khalick, F., Mustari, E., & Price, R. (2018). Effectual Reasoning and Innovation among Entrepreneurial Science Teacher Leaders: a Correlational Study. *Research in Science Education*, 48(6), 1297–1319. <https://doi.org/10.1007/s11165-016-9603-1>
- McLellan, E., MaCqueen, K. M., & Neidig, J. L. (2003). Beyond the Qualitative Interview: Data Preparation and Transcription. *Field Methods*, 15(1), 63–84. <https://doi.org/10.1177/1525822X02239573>
- Meoli, M., & Vismara, S. (2016). University support and the creation of technology and non-technology academic spin-offs. *Small Business Economics*, 47(2), 345–362. <https://doi.org/10.1007/s11187-016-9721-1>
- Miller, K., Alexander, A., Cunningham, J. A., & Albats, E. (2018). Entrepreneurial academics and academic entrepreneurs: A systematic literature review. *International Journal of Technology Management*, 77(1–3), 9–37. <https://doi.org/10.1504/IJTM.2018.091710>
- Miller, K., McAdam, R., & McAdam, M. (2018). A systematic literature review of university technology transfer from a quadruple helix perspective: toward a research agenda. *R and D Management*, 48(1), 7–24. <https://doi.org/10.1111/radm.12228>
- Obschonka, M., Moeller, J., & Goethner, M. (2019). Entrepreneurial passion and personality: The case of academic entrepreneurship. *Frontiers in Psychology*, 9(JAN), 1–15. <https://doi.org/10.3389/fpsyg.2018.02697>
- Obschonka, M., Silbereisen, R. K., Cantner, U., & Goethner, M. (2015). Entrepreneurial Self-Identity: Predictors and Effects Within the Theory of Planned Behavior Framework. *Journal of Business and Psychology*, 30(4), 773–794. <https://doi.org/10.1007/s10869-014-9385-2>
- Qian, X. D., Xia, J., Liu, W., & Tsai, S. B. (2018). An empirical study on sustainable innovation academic entrepreneurship process model. *Sustainability (Switzerland)*, 10(6), 1–15. <https://doi.org/10.3390/su10061974>
- Rasmussen, E., & Gulbrandsen, M. (2012). Government Support Programmes to Promote Academic Entrepreneurship: A Principal-Agent Perspective. *European Planning Studies*, 20(4), 527–546. <https://doi.org/10.1080/09654313.2012.665035>
- Seguí-Mas, E., Oltra, V., Tormo-Carbó, G., & Sarrión-Viñes, F. (2018). Rowing against the wind: how do times of austerity shape academic entrepreneurship in unfriendly environments? *International Entrepreneurship and Management Journal*, 14(3), 725–766. <https://doi.org/10.1007/s11365-017-0478-z>
- Shane, S., Locke, E. A., & Collins, C. J. (2003). Entrepreneurial motivation. *Human Resource Management Review*, 13(2), 257–279. [https://doi.org/10.1016/S1053-4822\(03\)00017-2](https://doi.org/10.1016/S1053-4822(03)00017-2)
- Siegel, D. S., & Wright, M. (2015). Academic Entrepreneurship: Time for a Rethink? *British Journal of Management*, 26(4), 582–595. <https://doi.org/10.1111/1467-8551.12116>
- Skute, I. (2019). Opening the black box of academic entrepreneurship: a bibliometric analysis. *Scientometrics*, 120(1), 237–265. <https://doi.org/10.1007/s11192-019-03116-w>
- Syed, I., Butler, J. C., Smith, R. M., & Cao, X. (2020). From entrepreneurial passion to entrepreneurial intentions: The role of entrepreneurial passion, innovativeness, and curiosity in driving entrepreneurial intentions. *Personality and Individual Differences*, 157(December 2019), 109758. <https://doi.org/10.1016/j.paid.2019.109758>
- Verheul, I., Rietdijk, W., Block, J., Franken, I., Larsson, H., & Thurik, R. (2016). The association between attention-deficit/hyperactivity (ADHD) symptoms and self-employment. *European*

Journal of Epidemiology, 31(8), 793–801. <https://doi.org/10.1007/s10654-016-0159-1>

Viljamaa, A., Varamäki, E., & Joensuu-Salo, S. (2017). Best of Both Worlds? Persistent Hybrid Entrepreneurship. *Journal of Enterprising Culture*, 25(04), 339–359. <https://doi.org/10.1142/s0218495817500133>

Wach, D., Stephan, U., Weinberger, E., & Wegge, J. (2020). Entrepreneurs' stressors and well-being: A recovery perspective and diary study. *Journal of Business Venturing*, February, 106016. <https://doi.org/10.1016/j.jbusvent.2020.106016>

Wadhwani, R. D., Galvez-Behar, G., Mercelis, J., & Guagnini, A. (2017). Academic entrepreneurship and institutional change in historical perspective. *Management and Organizational History*, 12(3), 175–198. <https://doi.org/10.1080/17449359.2017.1359903>

Weißer, T., Saßmannshausen, T., Ohrndorf, D., Burggräf, P., & Wagner, J. (2020). A clustering approach for topic filtering within systematic literature reviews. *MethodsX*, 7. <https://doi.org/10.1016/j.mex.2020.100831>

Appendix

Appendix 1: Interview questions

This appendix contains the interview question within each set as discussed in section 3.2.

Question set A:

- Can you briefly explain your background as an employee of a knowledge institution?
- What was your role within the knowledge institution where you worked?
- Would you describe yourself as an entrepreneurial person?
 - What shows this?
- (If entrepreneur): What kind of business have you started?

Question set B-1:

- At what times do you consider starting a business??
- What has been the main reason so far for not doing it?
- Did the knowledge institution influence this decision?
 - In what way?
 - Did the Technology Transfer Office (TTO) play a role in this?
 - Was this stimulating or not?
 - Did the mission/vision or the entrepreneurial focus of the institution play a role?
 - Was there (sufficient) support from the institution?
 - What is your experience with the transfer of technology and/or intellectual property?
- Were other parties and/or companies involved in a way that influenced your decision?
- Have certain government programs had a role in this?
 - Or legislation that made it less attractive?
- Which motivational factors make you want to start a business and become an entrepreneur?
 - Career advancement
 - Financial
 - Contribution to society
 - Intellectual challenge
- And which motivational factors keep you from it?
- Are there any other motivational factors that have not yet been named?
- What would have to happen for you to take the step to take action?
- What role could the knowledge institution play in this?
- Which other parties can play a role in this?
- Does this depend on context or motivation change? (Situation or entrepreneur himself)

Question set B-2:

- Did the knowledge institution influence this decision?
 - In what way?
 - Did the Technology Transfer Office (TTO) play a role in this?

- Was this stimulating or not?
 - Did the mission/vision or the entrepreneurial focus of the institution play a role?
 - Was there (sufficient) support from the institution?
 - What is your experience with the transfer of technology and/or intellectual property?
- Have other parties and/or companies been involved in a way that influenced your decision?
- Have certain government programs played a role in this?
 - Or legislation that made it less attractive?
- Which motivational factors led you to start a business and become an entrepreneur?
 - Career advancement
 - Financial
 - Contribution to society
 - Intellectual challenge
- Are there any other motivational factors that have not yet been named?
- Which has been the most important argument for you to become an entrepreneur?

Question set C-1:

- Was it considered at the time not to become a full-time entrepreneur but to combine it with the job at the knowledge institution? (Hybrid)
- Why is this interesting/not interesting?
- Under what conditions would it be interesting to choose a hybrid form?
 - Does this depend on context or motivation change? (Situation or entrepreneur himself)?

Question set C-2:

- Was it considered at the time to become a full-time entrepreneur instead of combining it with a job at the knowledge institution?
- Why is this interesting/not interesting?
- Under what conditions would it be interesting to choose a full-time form?
 - Does this depend on context or motivation change? (Situation or entrepreneur himself)?

Question set D:

- Do you have any previous answers you would like to add?
- Are you interested in receiving the Thesis when it is completed?
- Would you like to check the transcript of this conversation before I use it in the thesis?
- Do you have any further questions before we finish the interview?

Appendix 2: Coding results

In Table A2.1 the complete overview of all the deductive and inductive coding results can be found. This Table is the input for the results in chapter 4.

Table A2.1 - Deductive en inductive coding results

Group	Coding type	Academics	Hybrids	Entrepreneurs
Context: Institutional	Deductive	Currently satisfied Inaccessible and unclear IP policy Institution is a limiting factor Long IP process Lot of bureaucracy More focus on students than employees No entrepreneurial drive at institution No entrepreneurship support No infrastructure Not clear where to start Room to do new things Unclear from institution Unnecessarily complicated	Entrepreneurship in mission/vision Entrepreneurship support is still developing Freedom to start new collaborations Institution and market benefits Institution stimulates very little Institutions goal is to create and share knowledge Institutions operate slow Knowledge owner is project dependent knowledge transfer open innovation Long IP process Low level of facilitation Multidisciplinary availability No infrastructure Room to do new things Separate institution and company Start-up support from university Unclear from institution	Entrepreneurship in mission/vision Feeling like everything is done Institutional money interests Institutions operate slow Long IP process Lot of bureaucracy Unclear from institution Unfair position of institution

Table A2.1 continues on the next page

Context Environmental	Deductive	Existing network (partners) External research partners Little support from government Supporting organizations	Existing network (partners) External research partners Getting funding is time-intensive Institution and market benefits Knowledge owner is project dependent Long IP process Research funding Research partner owns knowledge Take-off grand	Existing network (partners) External research partners Research partner owns knowledge Take-off grand
Context: Personal	Deductive	Display entrepreneurial behavior Entrepreneurial from origin Interested in entrepreneurship Regularly recognize opportunities	Display entrepreneurial behavior Entrepreneurial from origin Entrepreneurial relatives Entrepreneurship is not the area of expertise Interested in entrepreneurship	Display entrepreneurial behavior Entrepreneurial relatives Interested in entrepreneurship Not dependent on income
Motivation: Financial	Deductive	Balancing financial risk Keep job to avoid risk	Job security Lower risk by keeping job Not financially dependent on the company	Can take the risk Not dependent on income
Motivation: Career advancement	Deductive	Looking for something new to do Next step in career	Better teacher because of experience Impact on possible achievement Next step in career	Career at institution not challenging anymore Next step in career
Motivation: Intellectual challenge	Deductive	Actually applying knowledge Contribute with the performed research Develop further than usual Job diversity	Actually applying knowledge Challenge of building a business Engage in the subject of entrepreneurship Job diversity	Actually applying knowledge Challenge of building a business Develop further than usual Job diversity

Table A2.1 continues on the next page

Motivation: Contribution to society	Deductive	Educating student Serving social interest Want to contribute to social/environmental subjects Want to employ people Want to help others	Contribute with the performed research Educating students Fascinated by a problem Serving social interest Solve a problem	Serving social interest Solve a problem
Motivation: Passion	Inductive	Enthusiasm Far-reaching affinity Fascinated by a problem Thrill-seeking Urge to become entrepreneur	Ability to continue specific research Being passionate Do not mind working overtime Enthusiasm Far-reaching affinity Fascinated by a problem Get satisfaction Job diversity Take satisfaction out of it	Always want to work on it Being passionate Enthusiasm Fulltime focus to create success Get satisfaction Job diversity
Motivation: Doubt and uncertainty	Inductive	Difficulties with a suitable balance Fulltime possibly is too risky Hybrid could be limiting Not knowing when a technology is ready Possibly hybrid to avoid risk Possibly hybrid to remain doing research Risk avoidance Risk of the unknown Wrong moment in career Wrong moment in life		